King's Mound, Oxford: for Balliol College. (T. G. Jackson, R.A., Architect.)

THE ARCHITECTURE OF OXFORD.—II.

By W. S. Purchon [A.].

[*Continued from p.* 676.]

THE manipulation of the Orders, or the employment of a "ghost" to manipulate them, was becoming a fashionable accomplishment in the first quarter of the eighteenth century. Dean Aldrich, of Christ Church, seems to have had considerable architectural knowledge, but he would doubtless have the wisdom to consult Wren and Hawksmoor. In 1705 he showed his knowledge of Palladian architecture by designing the three sides of Peckwater Quadrangle, wisely following Wren's example and avoiding the closed form. The lower story of this building is of masonry with strongly marked joints, the two upper stories being treated with an Ionic order of flat pilasters, except in the centre of each façade, where six three-quarter columns are used to support a pediment.

It is probable that in 1706 Aldrich designed the south front of Corpus College, but his best work is undoubtedly All Saints Church, built in 1708. The square tower standing well above the church is well treated with strongly marked quoins and is crowned by an entablature and balustrade, from within which rises a drum, whose upper part is surrounded by a colonnade of detached Corinthian columns. Above this again is an octagonal spire, urns masking the changes from square to circular and from circular to octagonal. The body of the church is treated with a large order of coupled Corinthian pilasters with an attic above, the portico being formed with detached columns supporting a pediment.

The library, erected between the years 1716 and 1761 on the south side of Peckwater Quadrangle, is the work of another amateur, Dr. Clarke, of All Souls, who was evidently impressed by the buildings of Vanbrugh and Hawksmoor, if indeed he did not get direct assistance from the latter. The façade is treated with colossal Corinthian columns rising through the two stories and supporting an entablature which runs unbroken over the seven

bays of the front. The original intention seems to have been to support the library on columns, leaving the lower part open, on the lines of Wren's library for Trinity College, Cambridge. The best features of the design are its simplicity and the strong angle treatment with coupled pilasters, and its defects are the squat proportions of the lower story, the lack of emphasis in the treatment of the entrance, and the way in which the whole building dwarfs the adjoining ones. The end elevations with their Venetian windows are rather crowded. The first floor is occupied by one large room with a gallery on one side supported on Ionic columns.

The buildings at the entrance to Worcester College consist of two wings, one the hall (completed 1784) and one the chapel (rather later), connected by a vaulted space over which the library was constructed. In the front to Worcester Street indications of the late date can be seen in the delicate detail. The interior of the chapel was richly decorated by Burges. The library, completed in 1746, may possibly have been designed by Clarke, but if so he abandoned the use of the great order and contented himself with using an order as a subsidiary feature in the central part of the upper floor. It is not a great building, but the pleasing effects of light and shade given by the arcade on the lower floor, the contrast between the central part and the side wings given by the use of the order and of the semicircular-headed windows in the former, the tying together of the parts by good stringcourses and a simple but effective cornice, and its general air of simplicity and lack of ostentation, are all good points. It loses much by the fact that the mass of the central part is practically the same as that of each wing. Passing through the arcade under the library, one sees on the right a somewhat dull range of buildings erected between 1753 and 1773, and on the opposite side the picturesque mediæval monastic houses, which were fortunately spared by that great blessing, for which we ought to be so profoundly thankful—lack of funds.

In 1735 a long block of Fellows' buildings was erected to the north of the earlier buildings at Magdalen, by another amateur, Mr. Holdsworth. Here again only scarcity of money saved the beautiful old buildings, which would have been removed quite cheerfully by the eighteenth-century architects. Whatever faults the present-day architect may have, he can at least appreciate the beauty in worthy buildings of different styles, and one can only hope that in the event of a further revival, whether Gothic or Greek, this blessed gift may not be taken from the architects who come under its influence. These new Fellows' buildings at Magdalen are not without merit. The monotony of the south front is relieved by the arcade and to some extent by the breaks at the centre and ends, but these breaks are inadequate, and the central feature should have been made more interesting. It would not have been a difficult task for a master to have made this a really fine façade. If at a casual glance the amateur character of the work is not obvious, it becomes so on a more careful inspection, for the central pediment is but a sham, and the north front, which is treated differently from the south front, got the designer into all sorts of trouble when he tried to connect them up at the ends.

Between the years 1737 and 1749 the Radcliffe Library was built by Gibbs, this architect superseding Hawksmoor here as at King's College, Cambridge. It is a circular building in which, resting on a strong basement story, a Corinthian order of coupled columns rises through two stories and supports a fine unbroken entablature with a balustrade having a pedestal and urn over each column. The spaces between the pairs of coupled columns are alternately large and small, the large ones containing the windows and the small ones being treated with niches. Above the entablature, from the parts over the niches rise curved buttresses to support the drum of the dome, which is constructed of timber with great ribs which continue the lines of the buttresses up to the crowning lantern. It is a fine exterior; it would have been a great one had Gibbs devised some means of connecting up his curved buttresses with the supporting masses below, and had he treated the latter more vigorously. The interior is not

equal to the exterior, for the arches supporting the drum are circular on plan, and have the defects unavoidable in such an arrangement; the pilasters of the drum are too heavy for the more delicate work below, and the plaster-work of the Italians employed here by Gibbs, as at the Senate House, Cambridge, and St. Martin's-in-the-Fields, is not worthy of the building.

THE RADCLIFFE LIBRARY. [Photo. J. R. Wigfull [d.].

Underground extensions to hold a vast number of books have just been completed below the open space to the north of the Radcliffe Library.

James Wyatt, who was responsible for various attempts to improve Gothic buildings, some of which have already been noted, designed in 1778 the Doric gateway to Canterbury

Quadrangle, a small quadrangle, built 1775 to 1783, opening off Peckwater Quadrangle in Christ Church College. He also built in 1788 the library in the Garden Quadrangle at Oriel College, the east side of which was built in 1719 and the west side in 1730. This library is chiefly interesting as an example of the more refined detail which was then being introduced, its Ionic capitals being so delicately worked that only one volute has remained intact. The arches on the ground story come much too close to the string which supports the Ionic columns, and the angle treatment in the upper story is particularly feeble.

Between the years 1772 and 1775 the Radcliffe Observatory was built from the designs of Wyatt and Charles Pears. It is an interesting example in the Adams' manner, the vigour of the work of Wren and his followers being replaced by that delicacy and refinement which, owing to a study of Greek models, were becoming fashionable. Its most satisfactory features are the general scheme of the building, in which the uses to which it was to be put were wisely treated as the dominating factor, and the skilful introduction of terracotta plaques, the soft Bath-stone of which the building is constructed being unsuitable for carving.

The New Clarendon Press in Walton Street, a large block of buildings surrounding a quadrangle and with an entrance gateway reminiscent of Constantine's Arch at Rome, was built in 1830 from the designs of Daniel Robertson. Mr. Blore was called in afterwards, probably to give assistance in superintendence rather than in design.

Following this, the Church of St. Paul, opposite the New Clarendon Press, was built with a Greek Ionic portico in 1836.

In 1841 a competition held for the Taylor and Randolph Institute was won by Cockerell, whose design consists of two tall wings, projecting boldly—perhaps too boldly—from a comparatively low gallery with a tetrastyle Ionic portico, the order being based on that at Bassæ, which Cockerell knew so well. The detail throughout is exquisitely beautiful, deserving a better fate than exile in this sunless land, and Cockerell has here shown how a building can be designed in the Greek spirit without making it either unsuitable for its purpose or a mere copy of a Greek design. Here such apparently incongruous elements as Greek detail, semicircular arches, prominent chimney stacks, and a great Italian cornice are welded together by the genius of an artist into an almost completely satisfying whole. One makes this limitation, for the mass of the link is hardly adequate for its purpose of connecting the two great wings, the detached columns supporting statues on the front to St. Giles are only satisfactory to the special pleader, and the climate of Oxford has not undergone the necessary modifications. At the date of the erection of this building the Gothic revival was in full swing, and the published opinions of its exponents on Cockerell's building were far more vigorous than most of their own designs.

At Pembroke College, the library, once the refectory, on the west side of the front quadrangle, is all that is left of the original buildings. The remainder of the front quad was built between 1624 and 1694, but it was considerably Gothicised in 1830. The chapel of Pembroke, a somewhat plain structure built in 1728 with the Ionic Order used externally, was fortunate enough to escape the Gothic Revivalists, but its interior was richly decorated in 1884 by Mr. C. E. Kempe. Mr. Hayward in 1848 designed the back quadrangle and hall in the manner of the Gothic Revival, which had been steadily increasing in favour.

Mr. Buckler, who worked on the restorations of the Church of St. Mary the Virgin, Jesus College, and Brasenose College, and who designed the County Police Station in the Norman style, designed in 1851 the hall of Magdalen College Schools, a pleasing example of Gothic revival work near Long Wall Street. The School House beyond the bridge was built in 1894 from the designs of Sir Arthur Blomfield, whose Church of St. Barnabas was opened in 1869.

The University Museum, designed by Messrs. Dean and Woodward, was opened in 1860. A competition had been held, and E. M. Barry's classic design and Woodward's Gothic one

were first selected, but the final choice—to Ruskin's delight—naturally fell on the latter. In the interior it may be noted that the designers, working on the mistaken assumption that the building, instead of being a setting for exhibits, should incorporate some of them in its structure, have made the many shafts out of samples of important British rocks. The capitals are carved with representations of natural objects, and the cast-iron columns which support

[Photo. Taunt & Co.

BALLIOL COLLEGE CHAPEL.

the glass roof are embellished with more naturalistic ornament in wrought-iron, but the searcher after architectural beauty will doubtless cheerfully leave this building to the scientist.

To Street's restorations of St. Michael's Church and the chapel of Jesus College, reference has already been made. In 1860 the Church of SS. Philip and James in the Woodstock Road was built from his designs, the spire being added in 1866.

But little remains of the early buildings of Exeter College. There is still part of the Old Gate Tower of 1432, but in 1834 the Turl Street front was rebuilt. The hall of 1618 has been

restored more than once, Mr. Reginald Blomfield's recent work here including some new panelling and two new fireplaces and mantelpieces. Sir G. G. Scott designed the front to Broad Street in 1854; his Gothic library was built in 1855, and in 1856 the chapel built in 1623 was pulled down to make way for a somewhat lifeless and toned-down version of the Sainte Chapelle. In 1890 the beautiful tapestry designed by Burne-Jones and executed by Morris was placed in the interior.

In 1861 the library of University College was built from Scott's designs in the manner of the fourteenth century, and in 1872-6 his dreary new buildings for New College were built facing Holywell Street. The Martyrs' Memorial, commenced in 1841 and based on the Eleanor Cross at Waltham, is one of his earliest works. Attention has already been drawn to Scott's work in the nature of what used to be called "restoration" in the Cathedral, and in All Souls, Merton, New, and University Colleges.

Of Balliol, one of the oldest of the colleges, very little of the old work remains. The Old Dining Hall, now a reading-room, belonged to the early part of the fifteenth century, but this and the library unfortunately came into the hands of Wyatt near the end of the eighteenth century. There are still a fine oriel window, supported on three beautiful corbels, and an old archway, but the latter is not in its original position. The uninteresting Fisher buildings at the corner of Broad Street and Magdalen Street were built in 1769 and refaced in 1876, and the Broad Street front was built in 1869 from Mr. Waterhouse's designs, and in 1877 the same architect built the new Dining Hall. In 1856 the old chapel at Balliol was pulled down and replaced by a new one designed by Butterfield in his earlier and more restrained manner. We have seen how in the eighteenth century it was only lack of funds that in many cases saved beautiful Gothic work from destruction, and that the architects of the Gothic Revival often had as little respect for Renaissance work, and now we come to what one hopes is the last chapter in the history of vandalism—the proposal to pull down Butterfield's chapel and to replace it by an imitation of the one which was removed in 1856. Let us hope that if those in authority do not appreciate Butterfield's work, they will at least realise that those who destroyed works of art in the eighteenth and nineteenth centuries had the same excuse to offer, in addition to the one that the buildings which displeased them were often not in the best of repair.*

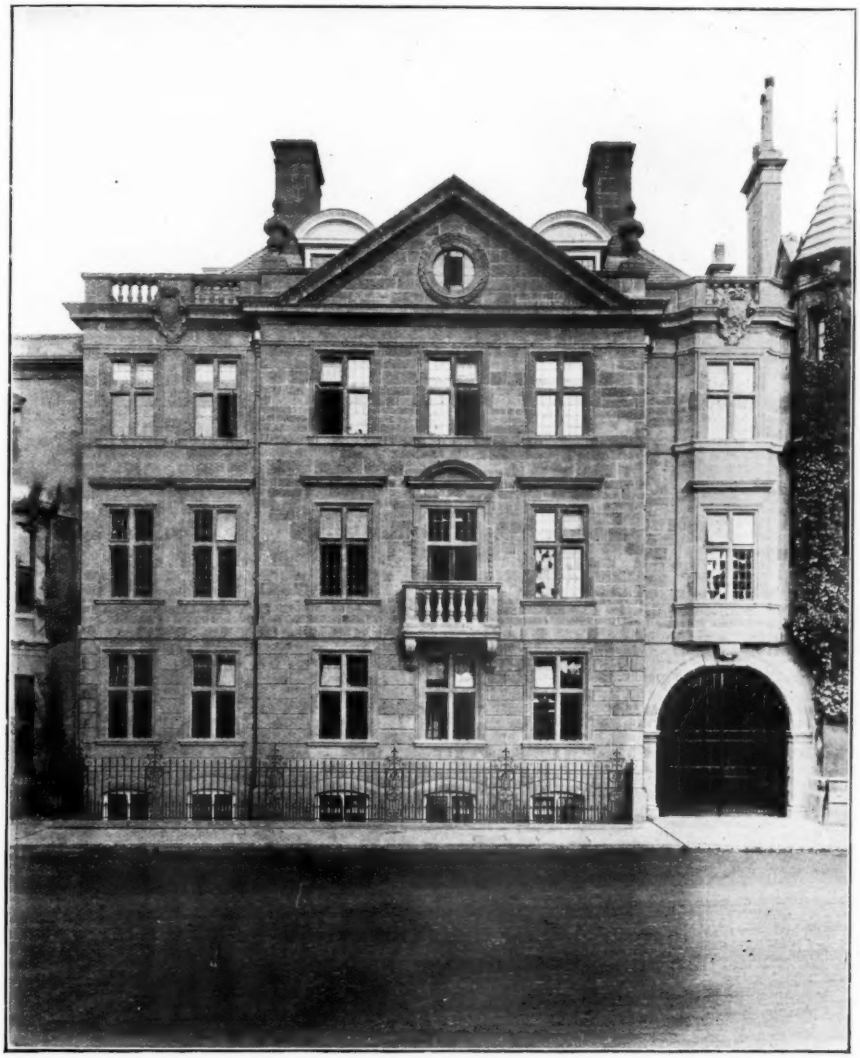
In 1870 Keble College, designed by the same architect, was opened, its chapel, planned as an ordinary church, being completed in 1876, about which date the hall and library were commenced. The restless appearance of the chapel, the result of Butterfield's inordinate love of colour, prevents one from appreciating its architectural qualities, but this defect is fortunately one which will doubtless be remedied by the kindly hand of time.

Messrs. Bodley and Garner's beautiful work at Christ Church, and Mr. Bodley's new roof to the Hall at Magdalen College, have already been mentioned. Between 1876 and 1879 these architects built the Master's Lodge at University College, and in 1880 St. Swithun's Quadrangle was commenced from their designs, the President's lodgings being built a few years later. Designed in perfect harmony with its beautiful surroundings, this group at Magdalen is one of the finest examples of modern work in Oxford. The austere but beautiful monastic church of St. John the Evangelist, Cowley, Oxford, by Mr. Bodley, was completed by the building of the tower in 1904.

In considering the work of Mr. T. G. Jackson in Oxford one is beginning a fresh chapter in the history of the buildings of that city, for his work is principally based on a study of the Early English Renaissance. In 1879 his Acland Nursing Home—a simple piece of design with sash windows and curved pediments—was opened, and about the same time his charm-

* It appears that the Master and Fellows of Balliol have decided not to rebuild Butterfield's chapel, *see The Times*, 9th Dec. 1911.

ing High School for Girls was being built in brick and rough-cast, with a fine cornice, a big simple roof, and sash windows separated by piers treated with pilasters. These were followed in 1881 by the High School for Boys, which is more characteristic of his style, and in 1882 his Examination Schools were opened. This is one of his most important buildings, and in



[Photo. E. A. Walsham.

BALLIOL COLLEGE, OXFORD, 1907. (Edward Warren, Architect.)

designing it he was strongly influenced by Kirby, though some of the detail in the interior suggests the influence of his Byzantine studies. Noteworthy features are the hall, with its gallery skilfully supported on great brackets and coffered arches, and the central feature on the west front of the quadrangle, with its three orders superimposed. The extension to the

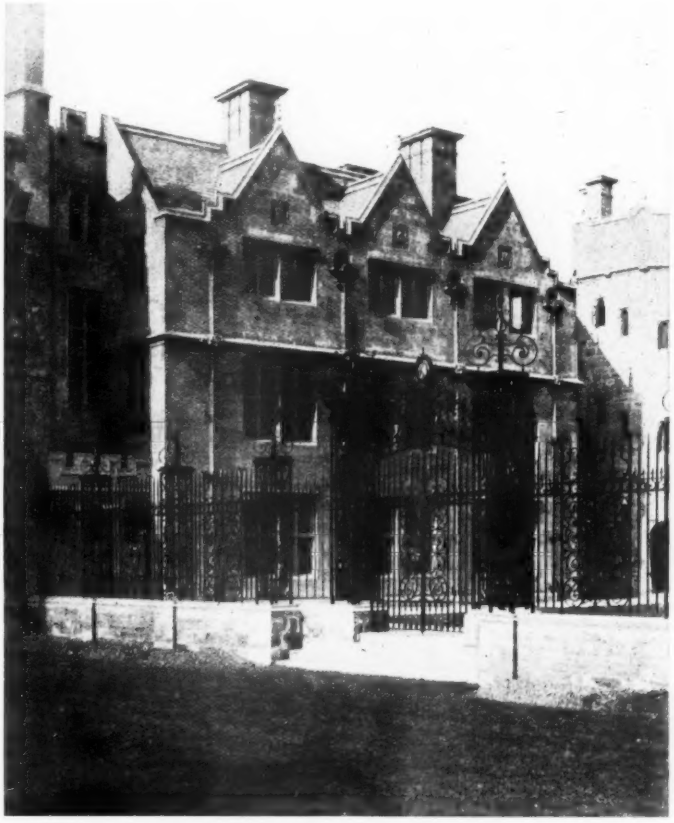
east, made in 1888, is on Gothic lines. Between the years 1883-7 he was at work on the fine new buildings, including the President's House, at Trinity College. In 1887, and again quite recently, Mr. Jackson has done excellent work at Brasenose, the President's House, with its series of richly crowned oriels, being particularly pleasing. At Hertford College,

HERTFORD CHAPEL. (T. G. Jackson, R.A., Architect.)

where his work, to harmonise with its surroundings, is more staid, Mr. Jackson built in 1889 the entrance gateway and hall connecting the two unexciting wings of 1822. He also built the new block on the north side of New College Street, but the bridge which he designed to connect the new block to the old has not been carried out. The beautiful new chapel at

Hertford, opened in 1908, is one of his finest works. Mr. Jackson's house for the Master of Balliol in Mansfield Road is an excellent example of domestic architecture. It is of stone, with brick and stone in the sturdy chimney stacks, in one of which the change from stone to brick and stone is very pleasingly managed by means of a diaper treatment. Mr. Jackson has also designed new buildings for Somerville College, Corpus College (on the north side of Merton Street), and quite recently the New Radcliffe Library and the Electrical Science Building, both close to the museums.

In addition to his new buildings Mr. Jackson is responsible for much important restoration work at Oxford, including work at the Schools Tower, the Church of St. Mary the Virgin, All Saints' Church, the Hall of Lincoln College, the Chapel of Oriel, and the Chapel of Wadham. Of most of his work in Oxford, it can be said without exaggeration or fear of contradiction that it is at home amidst its beautiful surroundings.



MERTON COLLEGE: PART OF NEW BUILDINGS. (Basil Champneys, Architect.)

Mr. Basil Champneys is responsible for a considerable amount of very interesting work in Oxford. In 1874 the Church of St. Peter-le-Bailey was built in the manner of the fourteenth century from his designs to take the place of a church which had been built in 1740, and which was pulled down as part of a street improvement scheme. His Indian Institute, built in the style of the Early Renaissance on a fine site at the east end of Broad Street, was opened in 1884. In 1886 he designed the charming house for New College, and in 1898 the Robinson Tower connecting it to Scott's dreary pile. At University College the same architect was to some extent responsible for the domed mausoleum (built to receive Onslow Ford's Shelley memorial statue), which connects up Sir Charles Barry's western wing (1843) to the older part of the college. Mansfield College, opened to graduates in 1889 for the study of theology, is a good example of Mr. Champneys' Gothic work, the buildings including chapel, library, dining-hall, common-room, and principal's house. In 1904 he added a fine library to Somerville College. To Merton College in 1907 he added a warden's house on the north side of Merton Street, and a set of new buildings

of great beauty on the site of St. Alban's Hall. The skilful manner in which Mr. Champneys has balanced his fine oriels with the other features is particularly noteworthy.

Mr. Champneys' latest work in Oxford is the extension to Oriel College with an important front on the High Street opposite the Church of St. Mary the Virgin. For these buildings, recently opened, the college is indebted to the late Cecil Rhodes.

Manchester College was built in the years 1891-3 on a site to the north of New College from the designs of Messrs. Worthington and Son. The college offers a training in theology to graduates. The buildings include a chapel and library, the former containing some glass designed by Burne-Jones.

Lady Margaret Hall: Entrance Front. Extension intended on the left.
(Reginald Blomfield, A.R.A., Architect.)

The Municipal Buildings, designed by Mr. Henry T. Hare, were opened in 1897. The site was as awkward as the requirements were varied, and Mr. Hare dealt with a very difficult problem in a masterly manner. He has arranged the various groups of rooms, provided adequate approaches to them, and at the same time masked so skilfully the awkward angles which occur in the interior as a result of the awkward site, that the whole scheme, which includes Council Chamber, Sessions Court, Town Hall, Assembly Hall, and Public Library, seems simple. The building is treated in the manner most characteristic of Oxford, and is detailed throughout with the greatest care. Externally the main entrance from St. Aldate's Street with the Assembly Hall over forms a fine central feature, and this is flanked on the

north by the offices on the ground floor and the committee rooms over, and on the south by the library, these flanks being treated with fine oriels on the first floor surmounted by great gables reminiscent of Kirby Hall.

The Choir School House for New College, built in 1903 from the designs of Messrs. Nicholson and Corlette, is a charming example of domestic architecture.

Mr. Warren, who has done valuable restoration work at Worcester and extensions for St. John's, designed a block of quiet dignified buildings on St. Giles for Balliol in 1907, incorporating in them some old panelling, an eighteenth-century stair, and a fine chimney-piece removed from the old building. The same architect is also responsible for pleasing domestic work in Oxford, including houses in King Street for Merton College.

Mr. Reginald Blomfield, to whose restorations at All Souls and Exeter reference has been made, in 1896 built a wing for Lady Margaret Hall. The large central block, containing the dining hall, library, etc., has just been completed from his designs, and it is intended to extend this by means of a wing to balance the earlier one. This work, which is in red brick with stone dressings, is carried out in the style of the Later Renaissance. One is accustomed to associate dignity and scholarship with Mr. Blomfield's designs, and the accompanying illustration of his work at Lady Margaret Hall can be left to speak for itself.

Having thus briefly examined many buildings of various types and degrees of beauty, let us now imagine that the visitor's last half-day in Oxford has arrived. He will do well, I think, to revisit Magdalen, to see once more its beautiful tower, to walk down "the stream-like windings of that glorious street" to the Church of St. Mary the Virgin. Then by way of the Radcliffe Camera into Broad Street, and so to the interior of Trinity Chapel; and finally I would have him spend an hour in the gardens of St. John's leisurely examining the garden front of that college. So that it will be with thoughts of these beautiful buildings that he takes leave of "that sweet city with her dreaming spires."

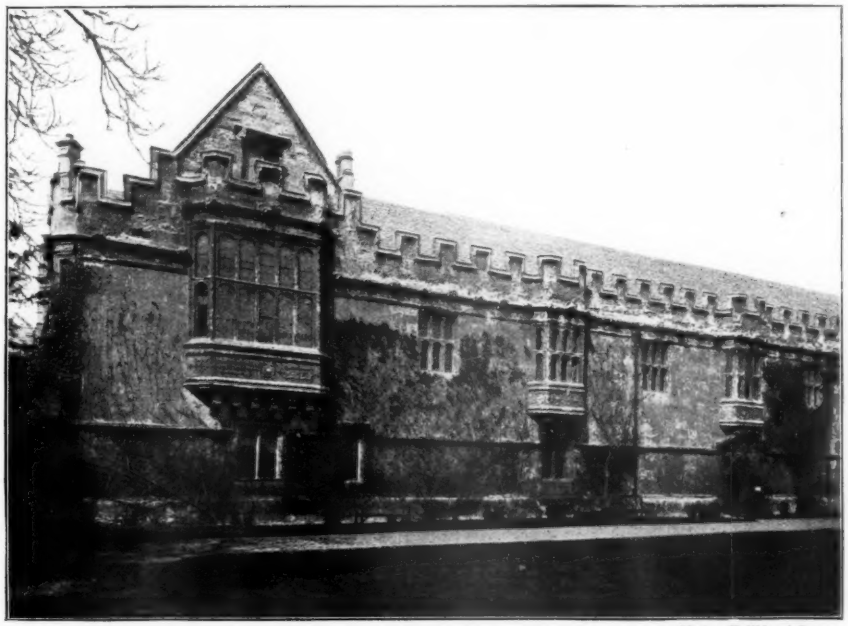


Photo: Holliday & Son.

ST. JOHN'S COLLEGE: GARDEN FRONT.

SCIENCE AND PROPORTION.

By Paul Ogden [*F.*].

Read before the Manchester Society of Architects, 6th December 1911.

THE following, whilst not exactly a text, is somewhat of that nature, and, being written by the Greek teacher Epictetus, is interesting, inasmuch as it refers to and is evidence of the Greek attitude of mind. Although many of you will be reminded of your school-days, nevertheless the reiteration now may be of value for the present purpose, as may also quotations from the three great masters who preceded him by about three hundred years. The following extract from the *Teachings of Epictetus* recalls the modern discussions upon Art and Architecture, and shows us in what manner they may be regenerated:—

> Behold, the beginning of philosophy is the observation of how men contradict each other, and the search whence cometh this contradiction, and the censure and mistrust of bare opinion. And it is an inquiry into that which seems, whether it rightly seems; and the discovery of a certain rule, even as we have found a balance for weights, and a plumb line for straight and crooked. This is the beginning of philosophy. Are all things right to all to whom they seem so? But how can contradictory things be right? "Nay, then, not all things, but those that seem to us right." And why to you more than the Syrians, or to the Egyptians? Why more than to me or to any other man. Not at all more. Seeming, then, doth not for every man answer to Being; for neither in weights nor measures doth the bare appearance content us, but for each case we have discovered some rule. And here, then, is there no rule above seeming? And how could it be that there were no evidence or discovery of things the most necessary for men? There is, then, a rule. And wherefore do we not seek it, and find it, and having found it, henceforth use it without transgression, and not so much as stretch forth a finger without it? For this it is, I think, that when it is discovered cureth of their madness those that mismeasure all things by seeming alone; so that henceforth, setting out from things known and investigated, we may use an organised body of natural conceptions in all our several dealings.

In support of the theory that the *Law of Numbers* is of the essence of that which architects call Proportion, and which by some is held as being beyond doubt, I propose to quote Epictetus, Plato, Aristotle, Pythagoras, Vitruvius, Descartes, Euler, Leibnitz, Schopenhauer, Hanslick, Spencer, Galileo, Hellenbach, Kepler, and Dalton.

Few architects there are who do not use the word Proportion. Some few have given us diagrams setting out buildings upon interaxial lines, but none have given reasons that the employment of such lines is of the essence of the matter. Diagrams we have of interaxial lines spaced a given unit apart for the plan, forming equal squares, and the same are used and have been used for elevations. We might go further than this, and use horizontal lines for the elevations, the spacing corresponding to the ratios of the musical scale. These will be found to give an harmonious, and consequently satisfactory, result.

Viollet-le-Duc speaks of the harmonic systems of proportion used by the Greeks, arguing "that they differ from those of the Middle Ages." He states that the system of harmony of the Greeks was derived from numbers, that of the Middle Ages from geometry. He suggests that these proportions should be known, and that without them we are unable to arrive at the essence of Greek architecture. In support of that theory he gives us diagrams of cathedrals of the Middle Ages set out upon his theory of triangles and geometrical figures. In addition to the method of triangles, he shows one or two cathedrals based upon squares, which method, as being different from his own, he accounts for by the fact that they are within the Roman influence. There is an interesting diagram of Amiens Cathedral based upon squares measuring 23 feet 6 inches along their sides. Viollet-le-Duc asserts that we have lost, and should try to find, that which is the essence of proportion.

Architecture would be the better if the scale were ignored or forgotten. If the area of the site of the building were divided into equal squares by means of interaxial lines, and the points of support placed upon the intersections of such lines, and carried up to points or levels of varying rhythmical planes, or of planes at the unit distance apart, and the screen walls filled in between the points of support to form the compartments, and the voids and the solids in such walls bore rhythmical proportions of one to the other and to the whole, we should have a building undoubtedly as pleasing, and it is submitted more pleasing, than buildings erected on the haphazard or unsystematic manner. If the centres of the supports are set upon the intersections of the lines, and the laws of equal halves obeyed, the intelligence will undoubtedly recognise and appreciate this right proportion. This skeleton scheme of interaxial lines which form cubes would be something like a well-tuned musical instrument, upon which you may play harmonious compositions should your knowledge of consonance, which to the architect means proportion, be equal to the task. While such compositions will be harmonious, they may or may not reach to the level of the virtuoso, or to the genius of a great architect, but the basis of such methods of composition can be in no way a hindrance to the latter, and should be an aid, whilst they prevent the average mind from creating dissonance.

It should be clearly kept in mind that the eye and

ear are media to the intelligence, and have no function apart from that. Some scientists assert, with great show of truth, that they are governed and affected by the same law, that is to say, by vibration. If rhythm and proportion are common to all objects worthy the name of excellent, and if we could infuse rhythm and proportion into such objects, we should have excellent objects, which would be the Greek view of what we call "the beautiful." No one, so far as I am aware, has been able to explain the inner meaning of this word "beautiful," so commonly used. It seems to be nothing but what could be called "proved excellence." An ancient Greek would not understand our use of the word "beautiful." "That which is excellent"; "That which is for the chief good"; "Art conjoined with true reason, and there is none which is not such"—these are the Greek views.

Science can aid us to this end. Art would be better if it embraced science. Science is mere deep thinking and sound reasoning. Pupils in art schools have the right to know *why* in addition to *how*. Clients, too, have the same right to know why. Men unlearned in science, or who have not a knowledge of it, expect acquiescence in their mere assertions. Such men have held positions as leading tutors in art, but only during periods in which science and art were divorced. With regard to the marriage of science with architecture, Cambridge University adopts the view that architecture may be rightly described as both an art and a science, and that an adequate knowledge of its history and its relation to art in general is important to anyone who wishes to practise it. In drawing up their regulations, the first part deals with the mathematical and scientific principles upon which the practice of architecture is based.

The more Greek art and its development is studied, the more it is found to be based upon scientific reasoning; that is to say, so far as our knowledge goes through reading broadly, but not, unfortunately, from any actual knowledge we possess with regard to their practice for the generating of their systems of building. Proof of this will be found in Plato's *Republic*, in Aristotle's *Ethics*, and in most, if not all, of the works of the ancient philosophers and teachers, all of whom appear to place rhythm and the law of numbers before all else. Even Cennino Cennini in the fourteenth century puts science before art, for he says, "now the most worthy is science, after which comes an art derived from science and dependent upon the operations of the hand, and this is called painting." Combarieu's work on the *Laws of Music*, which I shall quote at length, is the most recent contribution to this rhythm of life. He, too, takes the scientific side.

Coming to modern times we have some very clever evidence of research with the object of ascertaining, first hand, views of art outside the pale of civilisation, it being impossible except through books, which only give a bald history of the art of past generations, to gather what was really the view of art at various periods.

Whether we are right in judging by appearances alone is to be doubted. It has been thought that some parallel might be found in such research, by which the known history of appearances, which have been taken for art in the sense in which we understand that term, has, upon investigation, been found foreign to it. American professors have thought that the lack of this direct evidence might be partially supplied by research amongst the savages, whose works have been taken as early indications of art. These researches show that what is taken for art or pattern is nothing of the kind. It is the evolution of forms of identification marks. When they copy designs from foreign pottery, they do so in the belief that the copied ornament will produce the same virtues in their pottery that they believe inherent in the pottery from which they copy the design. The arrow markings are a species of heraldry and identification marks, showing the tribe and pedigree of the owner, who is responsible for the misuse of it, and is entitled to any honour of right use. The women are tattooed, not to enhance their beauty, but in order to preserve their identity. All these markings are understood by the tribes; in fact, they are more or less a history of the people, and interest them as such, and in no way are they understood as artistic productions. If they set them out in something like rhythmic sequence, it is only from the fact that rhythm is common to their nature as it is to ours. The patternlike markings of the hair-combs of the women are charms against disease.

The only difference between civilised nations and savages is that the pattern and designs of the former have no reason for their existence other than æsthetic, whilst the latter have true reason, so far as true reasoning in the savage may go, from their view of life. The æsthetic reason in their case does not exist. It amounts to this: the savage in all probability is like the Greek, artistic from our point of view, but not from his; he possesses no respect for anything which is not useful, but from rhythmic pattern-making in the one case, and from scientific reasoning in the other, is looked upon as possessing art for art's sake, a subject of which he knows nothing and cares less. The savage, no doubt, has rhythm inherent in him, as we have; he beats sticks and drums, and dances to time. His time, it is said, is more accurate than ours. These savages, some of them, have a moral code which would if practised by civilised nations tend to righteousness. The men and women are not only denied the right to marry their cousins, but are not allowed to marry in the same tribe.

From such, and similar research, may we not learn not to be sure of appearances? The things which we take for artistic productions may be foreign to anything of the kind, and in fact may be independent of it. Conclusions too hastily formed will do more harm than good. The perpetual reiteration

that such and such is beautiful really has no meaning. What we assert about the Greeks being inspired may, upon investigation, be found to be nothing but the result of a profound study of the reasons of things, the searching for rules and principles, and the acceptance of, and rigid adherence to, these rules. If you will read the *Teachings of Epictetus*, the works of Plato, Aristotle, Socrates, and the others, you can come to no other conclusion.

Aristotle in his *Ethics*, speaking of Art, says :—

So Art, as has been stated, is "a certain state of mind, apt to Make, conjoined with true reason;" its contrary is the same state with false Reason, and both are employed upon contingent or variable matter.

Plato in his *Republic*, after discussing the rhythm of dancing, poetry, and music, and the right kind of these to be used for the chief good, says :—

But painting too is somewhat full of these things; and every other workmanship of the kind; and weaving is full of these, and carving, and architecture, and all workmanship of every kind of vessels: as is moreover the nature of bodies, and of all vegetables: for in all these there is grace and awkwardness; and the want of grace, discord, and dissonance, are the sisters of a bad style and depraved manners; and their opposites are the sisters and imitations of sober and worthy manners. 'Tis entirely so, replied he. Are we then to give injunctions to the poets alone, and oblige them to work into their poems the image of the worthy manners, or not to compose at all with us? or are we to enjoin all other workmen likewise; and forbid this ill, undisciplined, illiberal, ungraceful manner, and allow them to exhibit it neither in the representation of animals, in buildings, nor in any other workmanship, and he who is not able to do this be not suffered to work with us? lest our guardians, being educated in the midst of ill representations, as in an ill pasture, by every day plucking and eating much of different things, by little and little, contract, imperceptibly, a great mass of evil in their souls. But we must seek for such workmen as are able, by the help of a good natural genius, to investigate the nature of the beautiful and the graceful, that our youth, dwelling as it were in a healthful place, may be profited on all sides; whence, from the beautiful works, something will be conveyed to the sight and hearing, as by a breeze bringing health from salutary lands, imperceptibly leading them on directly from childhood, to the resemblance, friendship, and harmony with right reason. They should thus, said he, be educated. On these accounts, therefore, Glauco, said I, is not education in music of the greatest importance, because rhythm and harmony enter in the strongest manner into the inward part of the soul, and most powerfully affect it, introducing at the same time uprightness, and making everyone upright if he is properly educated, and the reverse if he is not? And, moreover, because the man who has here been educated as he ought perceives in the quickest manner whatever workmanship is defective, and whatever execution is bad, or whatever productions are of that kind; and being rightly disgusted, he will praise what is beautiful, rejoicing in it; and receiving it into his soul, be nourished by it, and become a worthy and good man: but whatever is base, he will rightly despise, and hate, whilst yet he is young, and before he is able to be a partaker of reason; and when reason comes, such an one as has been thus educated will embrace it, recognising it perfectly well, from its intimate familiarity with him.

Again, pursuing the same train of thought, we read in Plato's *Republic* :—

And as for the man who is not able to give a reason to himself, and to another, so far as he is not able, so far will you not say he wants intelligence of the thing?

That in a most especial manner they attain to that part of education, by which they may become able to question and answer in the most scientific manner.

And is not this one prudent caution? that they taste not reasonings, whilst they are young; for you have not forgot, I suppose, that the youth, when they first taste of reasonings, abuse them in the way of amusement, and they employ them always for the purpose of contradiction. And imitating those who are refuters, they themselves refute others, delighting like whelps in dragging and tearing to pieces, in their reasonings, those always who are near them.

By what ought we to judge of whatever is to be rightly judged? Is it not by experience, by prudence, and by reason? Or has anyone a better criterion than these? The same magnitude perceived by sight, does not appear the same when near, and at a distance. And the same things appear crooked and straight, when we look at them in water, and out of water; and concave and convex, through the error of the sight as to colours.

Jules Combarieu, Professor of the History of Music, Collège de France, in his scholarly work *Music: its Laws and Evolution*, says :—

Can the principles brought to light by the two sciences of acoustics and physiology be explained—as Pythagoras, Descartes, and Euler would have it—by the more or less simple relation of numbers? Must we hold with Leibnitz "that music is an unconscious act of calculation"? Taking as our basis the first proposition, that music is the art of thinking in sounds, we shall reserve to ourselves the right of adding this, which is founded on observation: musical thought is the manifestation of a general and deep instinct, more or less hidden, but everywhere recognisable in humanity.

To the scholar who attempts, with the help of mathematics, to formulate the laws of multiple resonance, or to describe the mechanism of the ear in order to deduce therefrom the principles of grammar, we might say: "With what are you meddling, you musician of the laboratory, when you dare to point out the path and to lecture true musicians? Your labours have, no doubt, the interest which attaches to the observation and explanation of well-ascertained facts, but among all your experiments there is not one which has for its object a musical phenomenon. You study a note given by such and such an elastic body, and you are able to analyse it; you tell us what happens when two sounds produced at the same time have or have not common harmonies; you measure and you explain by numerical ratios an interval of an octave, of a fifth, of a fourth, etc., etc.; but all this is not music, any more than the letters of the alphabet are literature, or a few words made up of those letters are poetry. We can do without you. The siren of a Cagniart de la Tour has nothing in common with the sirens of antiquity!"

To take up this attitude, we might first rely on the almost unanimous evidence of those musicians who hold the interference of "men of science" to be useless or

annoying, and are much against listening to them at all. But as their opinion may be considered biassed, we might also claim support for the students of acoustics by taking advantage of their own disagreements. Helmholtz, who in 1863 flattered himself that he had given a scientific foundation to the A B C of musical composition, has been completely refuted by von Ottingen; and many people consider that Professor Stumpf, of the University of Berlin, gave the decisive blow to his theory. A French philosopher, M. Guillemin, Professor at the Algiers School of Medicine, thus sums up the matter: "Good cooking was known long before chemistry made its appearance; and even chemistry, since it has grown up, has not helped much to perfect cooking; in fact, some people assert that it has destroyed the art. It may be the same with music." Thus the existence of harmonics is denied by M. Guillemin.

Nevertheless, this will not be our attitude. It is an easy matter to seek out oppositions, to draw impassable lines of demarcation between the domain of artistic activity and that of objective nature; but what is really interesting is to search out the hidden harmony of things which appear as the most opposed to each other, or to see music in thought, thought in mankind, mankind in society, society in universal nature, all with incessant and minute interpenetration, crossings of lines, series of facts forming the transformations of force, and in sum that magnificent and stupendous harmonic whole called Life. It appears certain that, before they are organised within us, and take, under the influence of imagination, the shape of a melodious synthesis, sounds receive outside ourselves a primary organisation which prepares and conditions the work of the artist. These laws are made visibly manifest by experiments on a vibrating string or a small metal plate covered with fine sand. When a bow is drawn along the edge there appear in the sand nodal lines and curious geometrical figures. Nature is not a musician, yet she composes: she has a plan and a method; and she obeys inflexible laws. A Mozart or a Beethoven are completely ignorant of them, and yet they conform with them unknowingly. This we shall prove by the analysis of certain musical texts. By the production of facts, and not of personal theories, we shall endeavour to prove that the musical composer, standing at the point where two groups of influences meet, obeys instinctively laws which at one and the same time may be referred both to social life and to physics.

If this end is attained our task will, so far, be finished. We shall have brought back to unity all the branches of our subject, dominated by a single principle. Instead of a mere juxtaposition of facts, we shall have an intrinsic and essential co-ordination of the sciences enumerated at the beginning of this introduction; to wit, acoustics, mathematics, psychology, æsthetics, history, and sociology.

We can very well suppose a concatenation of sounds —such as every pianist is accustomed to improvise mechanically—in which the tonic and dominant chords are associated in conformity with the rules of musical theory, and which have yet no signification; that would form, to borrow an expression from Leibnitz, "regular sequences," and nothing more. There exists, consequently, an essential difference between the formula which is simply correct and one which says something.

In the mind of Hanslick there is an ornamental art which may help us to understand how it is possible for music to create forms which, while of great value, contain no exact sentiment: it is the art of the arabesque. Let us imagine arabesques which, instead of being inert and without life, like those of the delineator, should form themselves before our eyes, the work of a mind endeavouring to depict, by the movement of lines, an endless phantasy. This would be an exact image of music.

In the Memorial Rites of the Chinese we read that music is intimately connected with the essential relations of beings. Thus, to know sounds, but not airs, is peculiar to birds and brute beasts; to know airs, but not music, is peculiar to the common herd; to the wise alone it is reserved to understand music. That is why sounds are studied to know airs, airs in order to know music, and music to know how to rule.

The principle and aim of all these rules is the pleasure of the ear. Whose ear? That of the composer? Certainly not, since he is not free, and, if he were, there would be, on the same point of doctrine, as many rules as there are musicians.

It is evidently a question here of the ordinary ear, the ear of everyone, the structure of which regulates the average impressions whence are derived the general rules forced upon the individual. Hence the composer finds himself in a situation analogous to that of the writer, who is bound down by a language which he did not create, but is obliged to respect under the penalty of being unintelligible. No doubt he can modify it, but only to a partial extent, and never abruptly through an act of pure individual phantasy. In music, as in literature, there is no organic change excepting where an innovation has obtained the approval and sanction of the community.

The idea of "alteration," which plays so large a part in musical grammar, is very conventional, since, in reality, there are no "altered" sounds, but merely periodical vibrations, differing one from the other by their number per second. It is impossible to find in this any *raison d'être* other than in the instinctive demands of the ordinary ear, which, receiving the impression of an interval, at times remembers or expects an interval smaller or greater by a semitone.

There is therefore, from a tonic to its octave, hundreds, and even thousands, of possible sounds, regularly utilisable. Yet we only acknowledge seven, which with the subdivision of certain degrees gives us in all twelve sounds. There are two explanations of this fact.

The first is that the ordinary ear is incapable of discerning too small intervals. We hear talk of very practised musicians who easily distinguish and reproduce by their voice fourths and sixths of a tone, and even more. We have only to observe a great violinist tuning his instrument or rectifying it in the course of a piece, to note that his ear is sensitive to sounds of extreme delicacy. But these are individual cases, and it is exactly for that reason they have not given birth to the rational and logical system which they might have produced. The system which has triumphed is certainly very defective in the eyes of a scholar, and we should condemn it did not so many masterpieces blind us to its constitutional viciousness; its triumph is due to what pure theory calls routine, and what the sociologist might call the tyrannic influence of collectivity; it is due to the state of the ordinary ear, which is not that of the virtuoso, but of people with limited powers, incapable of receiving very minute impressions and imposing their way of feeling upon the artists who, all said and done, work for them. The second explanation is that the organisation of the scale has no other

principle and no other aim than the following:—to form, with a sound arbitrarily selected (tonic) and some of the sounds included in its octave, such relations as may produce those consonances which we have already mentioned, and which the ordinary musical intelligence considers as the easiest to grasp because they are the most agreeable. This principle once applied to the space comprised between two limits like 435 and 870 vibrations, it was naturally extended to each division of the whole field of sounds available for the art, and thus grew up our musical system, which in great measure is only justifiable by reasons of a social order.

We shall fortify this point of view, which reduces the scale to the consonances, if we add that, in reality, there only exist in music intervals consonant or non-consonant, and that the scale is a theoretical fiction.

The scale has no more existence than has the "root" in the words of verbal language. It nowhere appears in the most ancient creations of a popular genius. It is a system deduced from the analysis of a work; and it is not a fact of observation which can be isolated in the examination of a given melody.

Historically speaking, the scale is primarily what we call to-day a product of the laboratory or of the study, the creation of a Pythagoras or of a Ptolemy; according to these scholars it remains a bookish and pedagogic thing, and a handy means of exposition for purposes of tuition. Mozart in the scene with the Commander in *Don Juan*, Beethoven at the commencement of his first Piano Concerto, wrote no doubt for the instruments melodious sequences which may be called "scales"; but such works belong to a period when the theories of the schools made their influence on the genius of the masters to be felt.

Primitively one sings, and nothing more; now, there are no scales in the chant in unison or in part-singing. At the present day the pupil who is "practising his scales" on the ivory notes or on strings, is devoting himself to an exercise useful for giving agility to his fingers, but he is without the pale of real music.

The most diverse origins have been assigned to the bar, which we have just defined as a succession of accented and unaccented beats. Plato sees in it a reminiscence of the Absolute, the act of an artist obeying, like God when creating the world, the law of numbers. Spencer considers it as one of the "First Principles" which underlie the constitution of things, and beyond which we cannot go back; others have seen in it an imitation of the movements of a pendulum, of the beat of the pulse, of the normal stride, etc. . . .

Time is not a fact special to music; it may be considered (though this is not the only legitimate view) as a law of work pursued in common, forced upon man by the necessities of practical life.

We must not content ourselves with words, but must always keep before our minds the real facts to which the terms employed relate. Nothing is easier than to invent new "musical forms," but to think that this act of invention is necessarily a sign of genius is going rather too far. The more ignorant he is, the more the forms he uses will be "novel." Anyone who, in an opera, placed the orchestra on the stage in costume, and the singers in the orchestra in evening dress, would evidently produce a novelty.

Let us also remark that to the psychologist a novelty is the more "personal," the worse, the more incorrect, and the more inartistic it is. Nothing can be more original than the scrawls of quite young children. Contemporary musicians who have created "new forms" are legion; but do they all possess genius? They are in a situation similar to that of the gymnast or dancer who takes the most abnormal positions without, however, emancipating himself from the laws of gravity. We recognise, therefore, that when Beethoven wrote a symphony he arranged all the parts of it rhythmically, both because a certain order was inherent to the nature of his thought, and because this thought itself was unconsciously subject to the influence of the law which regulates periodic vibrations.

In the diagram of vibrations the phenomena of light occupy, like the musical sounds, seven octaves, if we include those which, situated in the regions of the infra-red and ultra-violet, are not decomposable by the eye; but visible light, decomposable by the colours of the prism, comprises but one octave, placed between the 48th and the 49th (of the series of 55 octaves of vibrations, which represent the phenomena known to us), viz. red, orange, yellow, green, blue, indigo, violet.

It is possible to construct chords of light on the same basis as musical chords.

Taking red at the limit of the spectrum, yellow at the (approximate) limit of the orange, and green at that of the blue, we obtain the ratios 8 : 10 : 12, which are those of the three notes of the major perfect chord.

Taking at their extreme limit the three colours which terminate the series of colours easily discernible by the eye—orange, green, violet—we get the ratios 10 : 12 : 16, representing the chord of sixth. By taking the terms of comparison in the middle region of the spectrum, we should still more easily find a counterpart to the chord of sixth and fourth.

Are the two senses of hearing and of sight formed by the same evolution and by a similar process? This is what the facts of history would seem to affirm.

Thus, after having observed the properties common to electricity and light, to light and radiant heat, to heat and to sound (*exceptis excipiendis*), it is difficult not to acknowledge a certain unity in things, with special laws for very different modalities.

This unity the mathematical physicist continually finds inscribed of itself in the formulas he uses, and in which it seems as if the phenomena he puts into words mutually exchange their language. When he meets with the same equation in the theory of attraction, in that of the movements of liquids, in that of the electric potential, in that of magnetism, and in that of the propagation of heat, etc. . . . it is difficult, unless one is blind, not to see that the most opposite phenomena, having no apparent relationship, are yet connected by a secret internal analogy, that of the principle which governs them.

Music has its place in this harmony. It is not an exception, a miracle; it forms part of a concert in which one can define its field. Its originality consists in belonging, at the same time, to two different worlds, and in subjecting to the conditions of objective life, to the laws of acoustics and of numbers, that flow of force which proceeds from the depths of feeling.

We can, therefore, extend to all phenomena the observations made above with regard to sounds and colours. As a rule, physicists are not fond of generalising; they study, especially, the restricted systems that observation can reach, and declare that they know nothing of the Universe taken as a whole. They willingly leave to philosophers the work of constructing theories which go beyond the range of experiment. Yet one idea disengages itself from their labours. If everything is vibration, everything is energy. Energy is not

merely a force superposed on matter and which, distinct from it, animates it by virtue of a fundamental law; it is identical with the things of reality and would suffice to explain everything.

Mathematics has no right to supreme power, but it has great claims to the gratitude of musicians.

1st. It serves—and it is an infinitely valuable service—to convey in plain language that which has been created by the musical instinct.

2nd. By placing before our eyes, by means of perfectly clear symbolical substitutes, musical facts, to the direct observation of which we should sacrifice an enormous amount of time, the mathematician shows us at one glance the corrections of which these musical facts are susceptible.

Thus arithmetic, it will be seen, after having been *ancilla cantus*, becomes *magistra cantus*, in the sense that it succeeds by degrees in disengaging from the facts the principle which governs them. In music it is not always, as in physics, the sole language used; the composer might even be unacquainted with it: feeling, imagination, and pure thought might fully suffice him. If, however, we do not rely on instinct alone and demand a doctrine, arithmetic presents itself first, since the musical construction is formed of measurable quantities. It is immensely convenient—eliminating all the complex peculiarities of things and only retaining their form, and it places before the eyes of the theorist symbols which save him loss of time, and on which he can work as on the realities themselves.

It has been objected that, on the one hand, numbers and numerical ratios reject all approximate calculations; that, on the other hand, in practical music everything is but approximation, perfect and absolute exactness never having been obtained; and that, consequently, all connection between the language of figures and that of sounds is vain. This objection would have the sole effect of demonstrating the utility of mathematics: they furnish means, more certain than the ear, of appreciating the errors themselves; and the system they allow us to set up, if never strictly followed by the virtuosi, is a necessary ideal which they should seek to attain as nearly as possible.

3rd. By causing reality to speak a language in very general use, mathematics enables us to perceive curious analogies between music and phenomena very far removed from it.

It was said by Galileo that the great book of Nature "is written in the language of mathematics." And, certainly, while bearing in mind that writing is not thought, we may say the same of a musical work, which can be entirely expressed by numbers and their ratios. Now, one of the great advantages of the expression of fundamental intervals by numerical ratios is that it allows us to make very easy comparisons between separate phenomena, and suggests to us analogies which without them might have remained unnoticed.

In a curious work, *The Magic of Numbers*, Hellen bach asserted that "the universe is constructed so as to realise as much as possible the law of simple and rational numbers."

This last affirmation will, perhaps, seem on a par with the idea of Kepler, that, when creating the world and regulating the order of the heavens, God had in His mind the five regular polyhedrons of geometry! But, without having such soaring dogmatic ambitions, we only need to read and compare in order to perceive, on certain points, an identity between the laws of music and those of chemistry. The comparison of these two orders of phenomena was already patent to the Greeks, who called by the name of Mixture and Combination—without distinguishing between the two—every emission of simultaneous sounds in simple ratios, and compared consonance to the "mixture of wine and honey." Let us recall some of the laws discovered at the beginning of the nineteenth century:

"When two or several bodies are united in several proportions, the weights of one of these bodies which unites it to an equal weight of the other are in direct proportion to each other." (*Law of Multiple Proportions, or Dalton's Law*, 1808.) For instance, oxygen forms with nitrogen six different compounds. In these the weights of oxygen, combined with a like weight of nitrogen, equal to 7, are respectively equal to 4, 8, 12, 16, 20, 24, or between themselves resemble our harmonics 1, 2, 3, 4, 5, 6.

"The weights according to which the different bodies are united to the same weight of the same substance represent the ratios according to which these weights unite among themselves, or are the simple multiples of these ratios." (*Law of Proportional Numbers*, ascribed to Berzelius, 1910.)

"When two gases combine, the volumes of the component gases are in direct proportion to each other; (2) the volume of the combination, measured in the gaseous state, in the same conditions of temperature and pressure, is in direct proportion to the sum of the volumes of the components." (*Laws of the Combination of the Volume of Gas*, ascribed to Gay-Lussac, 1810.)

Thus the volumes of hydrogen and of oxygen which combine to form water are in the simple ratio 2 to 1. This is the ratio which expresses the octave in music.

Mr. Alfred C. Haddon, in his book on *Evolution in Art*, says:—

> There are two ways in which art may be studied, the æsthetic and the scientific. The former deals with all manifestations of art from a purely subjective point of view, and classifies objects according to certain so-called "canons of art." These may be the generally recognised rules of the country or race to which the critic belongs, and may even have the sanction of antiquity, or they may be due to the idiosyncrasy of the would-be mentor. In criticising the art of another country it must be remembered that racial tendencies may give such a bias as to render it very difficult to treat foreign art sympathetically. Western Europe and Japan are cases in point. Dogmatism in æsthetics is absurd, for, after all, the æsthetic sense is largely based upon personal likes and dislikes, and it is difficult to see what sure ground there can be which would be common to the majority of people. The æsthetic study of art may very well be left to professional art critics.

We will now turn to a more promising field of inquiry, and see what can be gained from a scientific treatment of art. This naturally falls into two categories, the physical and the biological.

I am not aware that much has been done towards establishing a physical basis for art. The pleasurable sensations which line, form, and colour may give rise to are doubtless analogous to those caused by musical sounds, but with this difference, that the latter are caused by the orderly sequence of particular vibrations, whereas the vibrations of the former are synchronous. It is possible that not only must the character of these vibrations be taken into account, but that the structure of the human eye and personal equation must be allowed for in analysis of the pleasurable sensations caused by any work of art. These remarks necessarily refer only to the forms of things; their meaning and the sensations thereby evoked belong to the domain of psychology.

I submit that it is high time that some science or reasoning should be infused into architecture, and, indeed, into all that we call art. The texts of the writers on architecture, it is submitted, do not help us very much, as the following quotations may tend to show:

The history of Architecture is the history of the world.—A. W. Pugin.

The influence of the causes which act most powerfully on the genius of the arts, after the climate, are the manners, religion, and the changes to which a nation is subject in its political state during the course of ages.—Seroux d'Agincourt.

Unless art is the expression of the system it should illustrate, it loses at once its greatest claim on admiration and fails to awaken any feelings of sympathy in the heart of the spectator.—A. W. Pugin.

Architecture is the art which so disposes and adorns the edifices raised by man, for whatsoever uses, that the sight of them contributes to his mental health, power, and pleasure.

Architecture concerns itself only with those characters of an edifice which are above and beyond its common uses.—John Ruskin.

In what are generally understood as styles in the history of art, such as the Grecian, the Roman, the Gothic, the Renaissance, &c., may be recognised deeply interesting accumulations of experience concerning the nature of man's intuitive affections for certain concatenations of form.

Styles are usually complete in themselves; and, although not of uniform excellence, are still generally concordant amongst all the various members that compose them.—M. D. Wyatt.

Architecture depends on fitness, arrangement, and on proportion, uniformity, consistency, and economy. The perfection of all works depends on their fitness to answer the need proposed, and on principles resulting from a consideration of Nature herself; and the ancients approved only those which by strict analogy were borne out by the appearance of utility.—Vitruvius.

The essence of the fine arts begins where utility in its narrower acceptation ends. The abstract character of ornament is in that sense to be useless. That this principle exists in Nature we immediately feel, in calling to mind the merely beautiful appearances of the visible world, and particularly the colours of flowers. In every case in Nature where fitness or utility can be traced, the characteristic quality or relative beauty is found to be identified by that of fitness; but where no utility is found to exist, save that of conveying rational delight, or of exalting the mind by ideas of perfection, we recognise a more essential or absolute principle of beauty.—Sir Charles L. Eastlake.

Infinite variety and unerring fitness govern all forms in Nature.—M. D. Wyatt.

The useful is a vehicle for the beautiful.

There should be no features about a building which are not necessary for convenience, construction, or propriety.

All ornament should consist of enrichment of the essential construction of the building.

Pointed architecture does not conceal her construction but beautifies it.

How many objects of ordinary use are rendered monstrous and ridiculous, simply because the artist, instead of seeking the most convenient form, and then decorating it, has embodied some extravagance to conceal the real purpose for which the article has been made!—A. W. Pugin.

By means of design we inscribe, or ought to inscribe, upon every object of which we determine the form, all essential particulars concerning its material, its method of construction, and its uses.—M. D. Wyatt.

The primary consideration of construction is so necessary to pure design that it almost follows that when style and ornament are debased, construction will be found to have been first disregarded; and that those styles which are considered the purest, and the best periods of those styles, are just those wherein constructive utility has been rightly understood and most thoroughly attended to.—Redgrave.

All common and useful things may be refined into objects of beauty; and though common, all that is beautiful or high in art is merely an elaboration and refinement of what is fundamentally a useful and necessary art.—Fergusson.

Beauty is produced by the pleasing appearance and good taste of the whole, and by the dimensions of all parts being proportioned to each other.—Vitruvius.

If nature has made the human body so that the different members of it are measures of the whole, so the ancients have with great propriety determined that in all perfect works each part should be some aliquot part of the whole. Proportion is that agreeable harmony between the several parts of a building which is the result of a just and regular agreement of them with each other—the height to the width, this to the length, and each of these to the whole.—Vitruvius.

Those arts are generally considered the most worthy in which the mental labour employed and the mental pleasure produced are greatest, and in which the manual labour, or labour of whatsoever kind, is least apparent.—Sir Charles L. Eastlake.

All these, with the exception of Vitruvius, may be taken as merely asserting something in the nature of half-truths, which, as Epictetus says, "may be all false."

Professor W. Knight in the preface to his work on the *Philosophy of the Beautiful* gives his opinion that "Accurate knowledge of previous speculation is always our best guide in the study of a pro-

blem that is perennial; and while the history of philosophy shows that the most perfect theory is doomed to oblivion no less certainly than the imperfect ones, and that they all revive after temporary extinction, we can contribute nothing of value to the controversies of our time by striving after an originality that dispenses with the past." That the philosophers and others, from the most ancient of times up to the present, have never lost touch with the principles of rhythm and proportion in their reasonings, will be manifest if extracts are taken from their works. Professor Knight has collated such extracts in a very admirable manner, and probably his history is the best as regards historical sequence.

Dealing with Greek philosophy, surely most will agree with Professor Knight that the tendency was to bring all into harmony or into an harmonious whole, whilst the modern tendency is to divide and sub-divide, until it has missed the unity that underlies division. It is interesting to note that Euphranor, who was a painter and sculptor, wrote a book *De Symmetria et Coloribus*, and Professor Knight states that from Pliny down to Hirt (*Geschichte d. bild. Künste*) the symmetrical excellence of his own work has been noted. The value of this work to students lies in the fact that both in his practice and his teaching he developed the principles of Art which Greek philosophy had inculcated in its prime. The date of his birth, though doubtful, is given as about 362 B.C.

Professor Knight is of the opinion that the Latin race theorised less than the Greek had done. Relatively speaking there is no theory of the beautiful to be found at all in Roman literature.

When we reach the mediæval period Professor Knight states that, as soon as we see any sign of a revival of philosophy, interest in the problem of the beautiful returned as one of its elements. We have really little of note that would be of interest in a Paper like this until we come to the fifteenth century, when Savonarola (1452–1498), who was really a religious teacher, deals with the subject of the beautiful in one of his sermons for the Third Sunday of Lent. "In what does Beauty consist?" he asked. "In colour? No. In form? No. Beauty, as regards composite things, is born of the correspondence of parts and colours. The beauty of simple things is in their light. Behold the sun and the stars, their beauty is in the light they shed; behold the spirits of the blessed, their beauty consists of light; behold, God is light: He is beauty itself. The beauty of man and woman is greater and more perfect the more resemblance it hath to primary beauty. What then is this beauty? It is a quality resulting from the proportion and correspondence of the members and parts of the body. Thou dost not call a woman beautiful on account of her beautiful nose or hands, but when all is harmony. What is the source of this beauty? On investigation, thou wilt see that it emanates from the soul." Then we have Albrecht Dürer (1471–1528). His two chief works are the *Book of Measurements* and the *Book of Human Proportions*, and he says, "I have heard how the seven sages of Greece taught a man that measure is in all things (physical and moral) the best. Those arts and methods which most approximate to measurement are the noblest."

In dealing with the philosophy of Germany, as far as this Paper is concerned we have Kant, who, after dealing with negatives as to beauty, says in conclusion that we call things beautiful because our faculties work harmoniously in regard to them. With reference to Rudolf Hermann Lotze (1817–1881) Professor Knight considers that his specific teaching on the subject of the beautiful is not nearly so valuable as his criticism of the philosophical theories of others. He held that the things we call beautiful do not please us as individuals only, they please the universal spirit in us. The beautiful in itself cannot be a characteristic common to all beautiful objects. Beauty, however, actualises itself, both in the types of individual beings and in events. It is disclosed in their characteristics, and in the agreement between the free activity of any single living being and the universal laws of nature it finds expression. To impress us as beautiful, art must first please the senses (a physiological condition); it must secondly conform to general laws (a psychological condition). In other parts of his philosophy Lotze was much influenced by Herbart, but in the æsthetic he took a line of his own. Hans Christian Oersted (1777–1851), Professor of Physics at the University of Copenhagen, wrote papers on the Philosophy of Nature which with other papers were collected and translated from the German in 1852 by L. and J. B. Horner. Here we have dialogues on the principles of beauty, the natural philosophy of the beautiful, and the unbeautiful in Nature in its relation to the harmony of beauty in the whole.

The outcome of the first of these dialogues (says Professor Knight) is that the pleasure we derive from beauty depends both on reason and on the senses. Musical tones, for example, contain a hidden reason within them. Symmetrical figures, which delight us, do so because of the reason that is in the symmetry. They are conformable to rule, *i.e.* to reason. The circle is a perfect figure because it unites so many characteristics in its unity. It is not a mere abstract conception. It is an entity that is in itself beautiful, because of its essential idea. We find in the circle symmetry, completion, wholeness, unity in variety. The external image reaches us through the senses, and delights us, without our being conscious of the ideas which it contains and which lie within it. In the whole realm of inorganic Nature we find geometrical forms which are beautiful; and when we pass to organic Nature the lines and angles of crystalline beauty are exchanged for the curves and sinuosities of life and organisation. As symmetry lies hid in crystals and organisms, reason lies hid in tones. It lies there, on a firm foundation within our nature, not in sense only but in reason."

The two chapters on the natural philosophy of the beautiful were written later still. In them are discussed the laws of sound and of colour, in minute detail. We find that Nature produces the same forms as are created by human thought, and that what are thoughts within us are also laws of Nature without us. We thus discover that the laws of Nature are the laws of Reason, and that all Nature reveals the eternal living reason. "Soul and Nature are one, seen from two different sides."

Dealing with the philosophy of France, we have Descartes, whose letters were published in 1683; his views are sufficiently expounded for the present purpose in the extract above given from Combarieu. The characteristics of beauty, according to Crousaz (1663–1748), are variety, unity, regularity, order, and proportion. Subsequently he seems to lay chief stress on the threefold characteristic of unity in variety, proportion, and fitness. An object is beautiful (1) when it includes within it diversities reduced to unity, which occupy the mind without fatiguing it; (2) when it has proportion well sustained; and (3) when it is well fitted to its place. We do not require, however, to postpone our judgment as to the beauty of an object until we recognise these three things as present, because beauty forces itself upon us spontaneously. It triumphs over us, and our heart responds to it without the aid of reason. The question then is, has it a basis in the nature of things, or is its basis caprice? To determine this we must go to the root of human nature, and to the radical principle of the universe, which is harmony. Montesquieu (1689–1755) lays down the law that whatever we see at one moment should have symmetry; what we see in succession, variety. A. C. Quatremère de Quincy (1755–1849) says that the least analysis shows that the beautiful is composed of a principle of unity allied to variety, a principle of order and harmony, truth and utility—qualities which can be appreciated in theory, and applied in practice only by the union of reason, intelligence, imagination, and feeling—faculties existing in all men, but which are in the greater number inert. In 1867, Charles Blanc, member of the French Institute, discusses architecture, sculpture, and painting. He asserts that the sublime may be found in chaos, or the horrible, but beauty requires order, proportion, and harmony. M. Auguste Laugel emphasises the principle of order and harmonious proportions. He says: "The Beautiful cannot have its origin in tumult, in the echo of a set of sounds in which no measure or harmony can be discerned; nor can it be found, amongst the plastic arts, in a miscellaneous medley of colours and of lines. The ideas which the arts express must be made intelligible through forms and figures, light and shade, &c. . . . If there is no common measure, if contrasts are not managed with skill, if the small and the large, if light and shade, if the simple and the rich jostle with each other and are intermingled without judgment and without rule, all pleasure is lost, because the idea and the thought which underlie the material envelope do not exist." In 1883 the Abbé P. Vallet, Professor of Philosophy in the Séminaire d'Ivry, in his fourth of five elements of beauty, affirmed that "Unity must be found underneath variety, as that which animates the whole. But everything must not be sacrificed to this unity. If the unity is absolute, beauty is destroyed. It must be possible to disentangle the principal idea from the innumerable details which surround it, but it must not be presented naked and solitary; we must still retain "l'intégrité, la mesure, l'harmonie, le mouvement, la vie." Jean Marie Guyau (1854–1888) affirms that in life, morality, science, art, and religion, there is an absolute unity. Great and serious art is that which maintains and manifests this unity.

Dealing with the philosophy of Italy, Professor Knight says that the course of philosophic thought on the subject of the Beautiful has been more mixed up with the progress of the arts in Italy than in any other European country. Leon Battista Alberti (1400–1485) looked to Vitruvius as his master, and so did Peruzzi and Palladio, but Professor Knight thinks the most important link between *De Architectura* of Vitruvius and the modern books of Mr. Hay (who reverted to him explicitly) is the *Harmonices Mundi* of the astronomer Kepler. This book was published in 1619, and is divided into five chapters, entitled respectively: (1) Geometricus, (2) Architectonicus, (3) Harmonicus, (4) Metaphysicus, and (5) Astronomicus and Metaphysicus. In it the principle of symmetry and proportion is recognised as running through all things, and resulting in the "music of the spheres." The relations of musical and figure harmony are discussed, and this is a strict development of the principle of Vitruvius, by whom the principles of music were applied to architecture.

In Holland we have some views on the philosophy of the Beautiful. J. F. van Beeck Calkoen (1772–1811), Professor of Philosophy in Leyden, gives his conclusions on the subject of the Beautiful as follows: (1) What is perceived by the senses is beautiful, if its parts are arranged and combined after an intellectual order or law. (2) When we feel that anything is beautiful, that feeling is awakened by our discernment of the relation between the intellectual and material. Intellectual unity is always the foundation of the Beautiful. From this he infers, among other things, that in architecture, sculpture, and painting, Beauty lies in a mathematical order, by which the relation and position of lines and planes are fixed. The artist perceives this equation of lines and planes at once by sight, feeling, and inspiration through a mathematical fact. H. G. A. L. Fock (1875), in his remarks on symmetry or graceful proportions, states that those that are most pleasing

could be expressed by small numbers. If a line of say 130 possible sections be divided into thirty, forty, and sixty, such would be divided symmetrically, these proportions being expressed in the numbers three, four, and six. If divided into twenty-two, seventy-nine, and twenty-nine there would be no symmetry, because the proportion can only be expressed in the larger numbers. Professor Knight goes on to say that Fock is of opinion that the lost theory of Polycleitos, which he explained by a model figure, and by which he taught what the respective lengths of the different parts of the human body must be in order to give a graceful well-formed whole, was based upon this symmetry of proportion. He then proceeds to explain how this same symmetry is found in the dimensions of the Pyramids, the Greek temples, the Gothic cathedrals, in ceramic objects, gold and silver work, &c.—in short, in all true works of art, in endless variety ; also in the construction of the human body, and that of different animals. He believes this symmetry, in its new meaning, to be a condemnation of Zeising's aurea sectio, which is the division of a line (=1) into two such parts (a and b) that a : b : : b : 1, an æsthetic significance, in that it furnishes the most perfect means between absolute equality and absolute diversity, or between expressionless symmetry and proportionless expression, or between rigid regularity and unregulated freedom. J. van Vloten (1881) affirms that the principal rules to which all works of art must conform are method, unity in diversity, symmetry, and proportion, and that Adolf Zeising's well-known aurea sectio is the law that lies at the root of the study of proportion.

In English philosophy the first important statement is that of Lord Bacon : " That is the best part of Beauty which a picture cannot express ; no, nor the first sight of the eye. There is no excellent beauty that hath not some strangeness in the proportion." The first Lord Shaftesbury, in his *Miscellaneous Reflections* of 1774, affirms that what is beautiful is harmonious and proportionable, what is harmonious and proportionable is true, and what is at once both beautiful and true is of consequence agreeable and good. George Berkeley, Bishop of Cloyne (1684–1753), in a dialogue on Beauty asserts that all minds have ideas of order, harmony, and proportion. In 1814 S. T. Coleridge, in his *Essays on the Fine Arts*, says that the discernment of the harmonious relation of the parts of a thing each to each, and of all of them to the whole, at once and intuitively excites in us a feeling of delight. This is wholly different from a sense of what is agreeable, and it is in a sense intermediate between it and a perception of what is good. The scent of a rose may make it more agreeable to us, but it does not add to its beauty. John Flaxman (1829), in his *Lectures on Sculpture*, affirms : that Beauty is not merely an imaginary quality, but a real essence, as may be inferred from the harmony of the universe. Hazlitt (1819) says that Beauty consists in gradation and harmony. Henry Howard, R.A., Professor of Painting at the Academy (1834), dealing with the beauty of form, maintains that certain forms are beautiful intrinsically, apart from association ; and, referring to the theories which find the essence of beauty in " fitness, propriety, harmony, perfection," he says that they all virtually admit proportion to be an essential element of beauty, which he thinks a primary and universal element. Dr. M'Vicar of Moffat (1837), in his work *On the Beautiful, the Picturesque, and the Sublime*, asks, why is the symmetry of objects a source of beauty ? and why is the expression of objects increased when their mere symmetry is destroyed ? He answers that symmetry is the condition of perfection in organic bodies. Nature is everywhere endeavouring to realise equilibrium, in symmetrical and stable products. It is so from the structure of the solar system down to that of the flower. Thus simple Beauty has its signature in Nature ; it is not a creation of the mind. For our purpose it will be useful to quote Professor Knight's summary of D. R. Hay's *First Principles of Symmetrical Beauty*, Edinburgh, 1816. In it he tries, as he says, to develop the principles of Symmetrical Beauty, and their application to the arts, in a popular manner. Mr. Hay knew nothing of Plato when he began his studies, but he worked on the Platonic lines. He believed, as Sir Isaac Newton did, in " general laws with respect to all the senses," and therefore that there was an underlying analogy between the principles of form and those of sound. He laboured very much, as Michael Angelo did, with a view to discover the principles of Beauty. Of Æsthetics he says :

> In this science the human mind is the subject, and external Nature the object. Each individual mind is a world within itself, but the individual mind and the world at large have a relation to each other. The subject is affected by the object. . . . The science of æsthetics is devoted to the investigation of the mode in which external objects affect the mind, to please or to displease it, to produce a sense of harmony or of discord. Harmony is, as Aristotle defines it, the union of contrary principles having a ratio to each other. . . . The contrary principles are those of uniformity and variety, which give rise to two distinct kinds of beauty, according to the predominance of one or the other of them in an object. The one may be called symmetrical beauty, and the other picturesque beauty; the first allied to the principle of uniformity, in being based upon precise laws ; the second allied to the principle of variety to so great a degree that no precise laws can be laid down for its production.

He proceeds to show the operation of harmonic ratios, first on rectilinear figures, and then on curvilinear ones ; and tries to prove that by their union the laws of harmony are evolved, and that the principles of harmony which he has set forth are a natural and an inherent quality in geometry. In the *Science of Beauty, as developed in Nature and*

applied in Art, Mr. Hay expands his doctrine, his aim being to prove scientifically that the beautiful in Nature and in Art, which appeals to the mind through the eye, is governed by the same laws as govern the ear; in other words, that Beauty must conform to the laws of Nature in the plastic art of painting, as well as in the sister art of music. In this he was partly anticipated by a work, published in 1831, *The Music of the Eye; or, Essays on the Principles of the Beauty and Perfection of Architecture*, by Peter Legh, in which the resemblance of music to architecture is traced at some length, architecture being called the music of the eye. Mr. Hay says his aim is to rise superior to the idiosyncrasies of different artists, and to bring back to one common type the sensations of the eye and of the ear. He repeats almost verbatim the analyses and the contention of his former book, that symmetry gives rise to Beauty, and variety to picturesqueness. The science of Beauty is evolved from what he calls the "harmonic law of Nature," which is based on the Pythagorean system of numerical ratios. He applies it first to sound, afterwards to form (especially as seen in the form of the human head, countenance, and figure), and lastly to colour, and the proportions of ancient Greek vases and ornaments. He considers all æsthetic science as "based on the great harmonic law of Nature, which pervades and governs the universe, and which lies, as such, intermediate between the physical and the metaphysical sphere."

Professor Knight, citing with approval a review of Jeffrey, M'Vicar, and Hay in *Blackwood's Magazine* for December 1853, says:

> The writer holds that, if there be no standard of the Beautiful, "novelty" is all that is left to us in art-work. We can no longer speak of the great masters, or of any masters. If association can explain the Beautiful, then the study of æsthetics is but labour lost. (1) Beauty is, on the last analysis, but another name for perfection. The beauty of individual things is various; but the beauty of all beautiful things agrees in this, that they all approach perfection, and delight us according as they do so. (2) Beauty (which is perfection) is "as diverse in its forms as the several faculties and organs by which we come into contact with Nature." (3) These forms of the Beautiful are divisible into two great classes, viz. the intellectual and the material.

In his criticism of the association theory, the writer asks how it comes to pass that a circle is regarded, "semper, ubique, et ab omnibus," as more beautiful than an irregular figure, unless there be a standard of beauty in the mind? So also with colours and sounds. Differences in taste prove nothing against a standard, because each taste may have a standard for itself, and yet they may all vary, just as Greek and Gothic architecture vary, or as the several types of heroic action do. The writer affirms truly that "the beautiful and the good stand together on the same pedestal." We cannot hold by the one and despise the other. Acoustic science shows that the beautiful in music is based on certain objective harmonious ratios; so with the beauty of colours. Unity and variety are the two grand elements in all fine art compositions; and unity in variety (in other words, symmetry) is the first thing to be attended to in æsthetical science.

In considering the elements of beauty, William Scott (1861), an artist, begins with harmony of parts as the first and most necessary condition. The second condition is symmetry, every living creature being composed of two halves, each the exact counterpart of the other. All architecture is the triumph of symmetry. Professor J. F. Seeley, in a paper on the "Elementary Principles of Art," says that the different arts answer to different faculties, but in all of them delight is expressed by rhythm or proportion of some kind; and this rhythm, which runs through our whole existence, and without which life would be comfortless, is the principal thing in art. It is present in painting, sculpture, and architecture, no less than in poetry, music, and dancing. Rhythm is regularity in time, and regularity in space is form. This gives us the first principle in art, but added to it there must be imitation. This is the second of the two primary principles. It is imitation which is the passive principle in art, that gives to it its boundless range; whereas the other (rhythm or proportion) is the active shaping principle. By the one we find what exists in Nature, and reproduce it; by the other we give a new interpretation to what we find. Dr. Todhunter, M.D. (1872), finds that order and proportion are conditions of the Beautiful, order being symmetry, proportion being harmony. He deals with the seven colours of the spectrum in relation with the seven notes of the musical scale. Dr. Todhunter asks what is that which speaks to us through forms, colours, sounds, and what does it say to us? He answers that it is something that we instinctively recognise as good and right in and for itself, no product of blind forces, but of forces working intelligently and with mutual helpfulness to a definite end. Through it we pass beyond ourselves to the Divine.

May it not be said that originality is a species of conceit; of over-confidence; a desire to attract attention by oddities; a proof of the lack of ability to improve upon previous productions; lack of the desire for and of the necessary knowledge to accomplish this and prove it; hence decadence?

Great artists and architects have never hesitated to copy the works of one another. Why should lesser minds hesitate? Is it only because they wish to be original? To such an extent has the pride of originality grown, that the Royal Institute of British Architects has been compelled to support a Copyright Bill in Parliament. This may have the effect of throwing us back upon tradition, permeated by the spirit of advanced scientific reasoning. Such method would make for progression upon right lines.

If we are to succeed, we must find one common

rule applicable to all, not only to architecture, but to music, dancing, painting, poetry, and all objects whatever their utility. This one rule, it is submitted, is harmony, which springs from rhythm, which springs from measurable and synchronous vibrations: in architecture, that which we call proportion. Buildings raised upon a skeleton frame of proportional spacing of lines, upon which, and around which, we construct proportional voids and solids, one unit to each building, subdivided in measurable proportions, even down to the smallest ornament, might be a solution of this problem of rhythm and harmony in architecture. Some objector may ask, all buildings in one street, or adjoining one another, on one unit? The reply would be: "It is desirable they should be on proportional units." Individual bands within earshot of a listener but not of one another, although playing one composition, the pitch and time varying, are distressing; but when massed and playing the same composition, the pitch and time agreeing, are pleasurable.

Is it, or is it not, strange that terms used in music and art are synonymous, such as "Tone," "Harmony," and many others? Architecture has been called frozen music—is this not very near the truth?

Architects look to the visible parts of a building, never search for invisibles, assuming there are none, yet these are the true essentials of higher architecture. Not to do so is a species of laziness or indifference. Men who state that they use their eyes only are labouring under a delusion. They are fighting against their intelligence. If it is remembered, and clearly kept in mind, that the eyes are media to the intelligence, much confusion will be avoided. The sketchers and picture makers do little towards the advancement of higher architecture. Some, indeed, trouble to inquire why the building was erected, but these are few. They fill their books with portraits of buildings but know nothing of their characters.

No information of the actual use in practice of interaxial or of proportional lines can be found, only the theory. What has been given to-night has been collected during the perusal of the works of the authorities given, and notes made of matter which might tend to prove that by such means alone can the higher knowledge of architecture be obtained. Try as you will, information cannot be had of the method of putting into practice the rules and principles of the Greeks. Where to search it is difficult to ascertain. That it will be obtained from some source other than books on architecture there can be little doubt. To-night, extracts from unusual sources have been the means of laying before you theories or principles, and are the result of reading outside the beaten track. We shall have to go further afield yet before the true principles can be collected. Where next to look for information it is difficult to say.

I have not put up a building yet without using the method of interaxial lines, which may be a sound reason for rejecting it. The work is set out by rods of the unit length prepared in the following way:—A piece of pine 6 inches square is cut to the die true length of the unit and accurately squared at the ends. From this 16 rods are cut, 1½in. square—these only are used, and the men have no rules or scales, simply these data. They find no difficulty—in fact, all have found simplicity. For cottages and lodges I have used the unit of 3 feet 3 inches, houses 4 feet to 5 feet, schools 5 feet 3 inches, clubs 5 feet 6 inches and 4 feet 9 inches, works 10 feet, 15 feet, and 20 feet, furniture and ornament some measurable unit of the main unit. The drawings made for the Art Gallery, a sketch of which was published in the *Manchester Guardian* for 4th March 1905, had a unit of 10 feet, and multiples of 10 inches (three courses of brickwork) were taken as the depths of the beds of ashlar. Each block of building was proportional to the other in mass and in detail.

I do not purpose to give any illustrative diagrams. It would be useless to do so unless what I have adduced has been sufficiently conclusive evidence to go on with the work, the magnitude of which is such that a lifetime would not suffice. We have lost the nature of the practice of the ancient Greeks: is it possible to regain it? It rests with us, at least, to make an effort. This paper is a very slight contribution in aid. Science, it is submitted, is the highway by which the solution may be reached. Remember that the Greeks have laid down clearly that you must search for rules by which to work; have told you that true reason is necessary to art; that rhythm is not common to art, but is the foundation to everything necessary for the Chief Good. The Chinese affirm that it is necessary to know music in order to know how to rule. Lastly you have Combarieu, who, I think, proves from many authorities what the Greek has stated—that the law of numbers rules the world, or rather the properties inherent in vibrations, measurable and synchronous, harmonic, rhythmical, and in consonance, are of the essence of the Chief Good in Life.

What is this "Life," this something that creeps into all science, art, philosophy, and physics, when and where ever debated? We know it to be something invisible—is it power? We know that power is necessary and antecedent to the making and the doing of anything, and that it is invisible. It is inconceivable that power was not antecedent to creation. This power must have always been, always will be, and there was never a time when it was not. This power is the Uncreated Creator, and is disseminated through everything, and is that which we call Life. It is inconceivable that there should be any but the One Power, that which the Greek philosophers call God, and which we call Almighty God—the Original and only Power.

REVIEWS.

ROMANESQUE ARCHITECTURE IN FRANCE.

L'Architecture Religieuse en France à l'époque Romane: Ses Origines, Son Développement. By R. De Lasteyrie. 4o. Paris, 1912. [Alphonse Picard et fils, 82 rue Bonaparte, Paris.]

This very valuable book is likely to take the place of all previous ones on its special subject. The name of M. de Lasteyrie alone sufficiently guarantees its excellence. Its title, however, hardly covers its contents, for of its 720 pages of text the first 140 are devoted to the history of the origin and plan of the basilica, and 80 pages to Carolingian architecture.

The first of these two parts, excellent as it is, seems rather unnecessarily detailed, for as the author admits that France possesses hardly any religious building older than the ninth century, the immediate influence of the earlier buildings still remaining in Italy has been but slight. All that is said about them is of great interest, though in common with all the chief modern archæologists he considers them to be generally of later date than used to be thought, except in the case of the nave of St. Lorenzo fuori le Mura at Rome, as to which he adopts Rossi's view that it formed part of a fifth-century church with an eastern apse, and that Pope Honorius in 1216 did not build it, but by destroying both apses, which were back to back, simply threw two churches into one. He agrees, and no doubt rightly, with what is the general opinion at present, that the origin of the plan of the Christian church is to be found in that of the Roman house. In explanation of the statement of Vitruvius that basilicas existed in some of the larger Roman houses, a passage is quoted in which he speaks of the œcus or central hall in Egyptian houses as having columns carrying a wall with windows, expressly comparing it to a basilica, a name applied to any building, even to a riding-school, which was lighted in this way.

In accounting for the use of arches rather than of entablatures on columns, he might perhaps have laid stress on the gradual failure of the supply of the marble tribute sent to Rome during the earlier Empire. When the early Christians could get or steal blocks of sufficient size for an entablature they generally used them, as in S. Lorenzo and Sta. Maria Maggiore. But the preference for the arch was undoubtedly growing before the Empire became Christian, as may be seen in the Palace of Diocletian at Spalato and in the buildings of Central Syria.

As to Carolingian buildings, he considers that practically none are left in France except Germigny-des-Prés—the Basse-Œuvre of Beauvais dating from about 990, while St. Remi of Reims, Montiérender, and Vignory are all of them eleventh century. The different points of view of French and German archæologists are frankly admitted by him in speaking of Steinbach and Lorsch, which the Germans consider to be of the ninth century, but which would, according to the views which have prevailed in France for the past forty years, be considered to be of the eleventh. We confess that we think that the Germans are right in attaching less importance to documentary evidence than the French do. It does not always follow when a building is said to have been burned and restored that it was completely rebuilt.

On the mysterious question of the interlacing knotted twist, so common from the seventh to the ninth century, our author agrees neither with Cattaneo who calls it Italo-Byzantine, nor with Rivoira, de Dartein, and others who attribute it to the so-called Comacine masters of North Italy. He denies that the name Comacine is in any way connected with Como, but there certainly is an island Comacina which was the last stronghold held by the Imperialists against the Lombards.*

There undoubtedly was greater continuity between the Roman Collegia and the mediæval guilds than is usually allowed for, and this continuity would account for the strongly classical character of the south of France Romanesque, since Roman traditions and organisation retained their vitality much longer in Provence than elsewhere. Whether the twists were the sign manual of the Comacines, or were brought with them by the northern barbarians, it is impossible to say; personally we believe them to be of classical origin. The fact that the cathedrals, except Chartres, were much less important centres of pilgrimage than the abbeys is well accounted for by their having existed before the worship of relics attained its great development; and the same fact explains why the monks were often their own architects, and excuses the error into which Viollet-le-Duc fell of sharply distinguishing the monastic and the lay schools of art. Architecture was a layman's art from the first. There was no such thing as a universal Benedictine style, though the Cistercians very nearly established one of their own, as Mr. Bilson has clearly shown. The whole question of vaulting is carefully and clearly treated, and the opinion of Rivoira that the ribbed vault was employed by the Romans is refuted. Their brick ribs were drowned in the vault, and were not like the true rib, a mere centering carrying independent panels. He claims its invention for the Ile de France and St. Denis, and rejects the claims of Durham, Morienval, and Lusignan; but the fact is that the idea of the ribbed vault was "in the air," and it appears all over Western Europe at about the same time—during the first thirty years of the twelfth century. M. de Dartein was certainly wrong in attributing its origin to S. Ambrogio of Milan or S. Michele of Pavia.

A protest is rightly raised against the confusion

* *V.* Hodgkin, *Invaders of Italy*, vol. v.

introduced in the eighteenth century into the use of the word "ogive" by its being taken to mean a pointed arch. It means the diagonal rib of a Gothic vault and nothing else, and M. de Lasteyrie rightly employs "arc brisé" for the pointed arch.

As for the dome on pendentives of the churches of Aquitaine, it is claimed that it was either a tradition handed down from Roman times, or derived from S. Vitale. Like Mr. Phené Spiers and M. Brutails, he refuses to see in it any traces of Byzantine influence, owing to the differences in construction, outline, and general structure.

Chapters ix. to xii. are a very careful and elaborate analysis of the plans and details of Romanesque churches. If we are allowed to criticise work so thoroughly done, we would say that works from widely separated districts are too often placed side by side for comparison as if there were some close relation between them. We are glad to notice the warm admiration expressed for the wide aisleless naves, such as Toulouse and Angers. It may be of interest to note in passing that just before the German war the clergy of Toulouse were doing their utmost to get their splendid Romanesque nave destroyed, and replaced by one in the style of the fifteenth century to correspond with the choir, and it is to the credit of Viollet-le-Duc that he prevented this act of vandalism by insisting that if anything was destroyed it must be the choir in order that it might be rebuilt to match the nave. In speaking of the great Romanesque and Norman triforium galleries the view is adopted that their purpose was in no sense liturgic but purely architectural. They were intended to prop up the walls of the nave or buttress its vault, as they still do at Gloucester. In the original cathedral of Le Mans, however, there were six altars in the "deambulatory," which the author (p. 187) takes to mean these triforium galleries. But it is difficult, in spite of their being said to be "sursum," not to think that the apsidal aisle is meant with its ring of chapels.

Chapter xi. is devoted to the exterior of Romanesque churches. The first point noticed is how by the eleventh century the exterior of the churches was beginning to be considered and not only the interior, even in towns where the buildings were crowded against one another. Above all is to be noted the beautiful grouping of the apse and its "absidioles," with perhaps a central tower, as at St. Sernin of Toulouse, where, however, the original character has been partly destroyed by Viollet-le-Duc's substitution of large slabs with ugly raised joints for the original roof.

One difference is to be remarked between these early and the later cathedrals in their possession of cloisters, which had become desirable since in the eighth century St. Chrodgand had instituted canons subject to a quasi-monastic rule for the secular priests.

The origin of tower-pinnacles is neatly explained by the need for some weight on the diagonal arches, which change the square of the tower to the octagon of the spire in order to prevent their rising (p. 397).

In chapter xii., after examining the various schemes of classification of De Caumont, Viollet-le-Duc, and Quicherat, the author adopts one based on the roofing system into eight schools, which he names after the provinces in which they took their rise, but to the geographical boundaries of which they were by no means limited, as ecclesiastical divisions had at least as much influence as geographical. His eight divisions are those of Provence, Burgundy, Auvergne, Poitou, Normandy, the Rhine, and the Ile de France, and the domed churches of Aquitaine. As regards our Anglo-Norman buildings, he differs from Mr. Bilson in considering that the vaults of Durham, instead of having been finished by 1133, are not older than those of St. Denis. He denies that the statement of the Chronicle that the cathedral was finished "*usque testudinem*" at the death of Flambard, 1128, means that the vaulting was finished, because he says "*testudo*" in mediæval Latin means the *covering* (*i.e.* the roof), and that when it means vaulting it has the epithet *lapidea*. In this contention he is probably correct, but he does not thereby destroy Mr. Bilson's view, which is founded on a most skilful expert examination of the building itself.

The remaining chapters are devoted to a very careful and interesting account of the decoration and details of Romanesque, with beautiful photographs chiefly from the series published by the Monuments Historiques (*e.g.* that on p. 672 from Vézelay). Indeed the book as a whole is most remarkable for the number and beauty of its illustrations. Many of them, like that of Fontgombault, form beautiful little pictures (p. 359). In the views of interiors the points of view are generally skilfully chosen, as in the view of St. Germer (p. 542), where the detail is shown by the bay on the left hand while the rest gives the perspective of the apse, and in the crypt of Jouarre (p. 45).

We notice a misprint on p. 522, line 4 from bottom: "orientale" should be "occidentale."

G. H. West, D.D. [*A.*].

Selsley Vicarage, near Stroud, Gloucester.

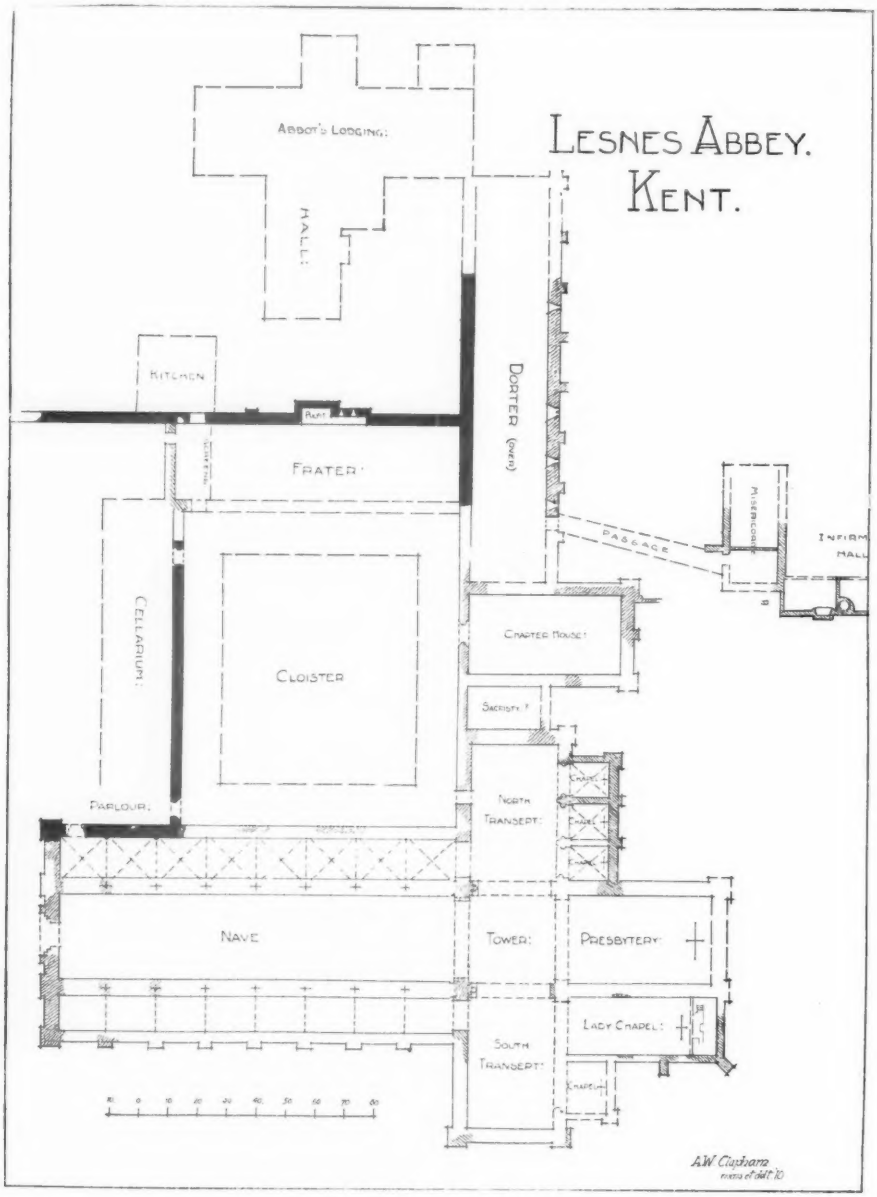
LESNES ABBEY.

The History and Remains of the Augustinian Abbey of Lesnes. By Alfred W. Clapham. [*Transactions of the St. Paul's Ecclesiological Society. Vol. VII. Part I.*] [*Harrison & Sons, 45 Pall Mall, S.W.*]

There are many Societies which to the outside world are known best by their works. In matters ecclesiological and antiquarian, the St. Paul's Ecclesiological Society holds a high place, and its works in the form of *Transactions* are of special interest to all who delight in the past. Such Societies are carrying out a very important public service in the compilation and preservation of records and particulars of buildings such as Lesnes Abbey.

There is still a large field for investigation, for it appears that out of the forty or so abbeys and priories in the County of Kent, only seven have been systematically examined.

The Augustinian Abbey of Lesnes is almost a recent discovery. It is only about three years ago since the Woolwich Antiquarian Society, on the initiative of Mr. W. T. Vincent, and under the supervision of Mr. A. W. Clapham, began a tentative excavation on the site of the old Abbey. The work has proceeded somewhat slowly from lack of funds, but the foundations of the Abbey buildings



GENERAL PLAN OF THE EXCAVATIONS.
From block kindly lent by the St. Paul's Ecclesiological Society.

or at any rate the greater part of them, have now been opened out.

The remains above ground are confined to one or two rough stone walls, probably built with the materials obtained on the destruction of the main fabric. The excavations, however, have revealed the ground plan and foundations of an abbey church of considerable dimensions, and the further excavations still proceeding will, it is hoped, disclose the complete arrangement of the domestic buildings of the Abbey.

The Abbey of Erith or Lesnes was one of the later of the Augustinian foundations, and was founded in 1178 by Richard de Lucy, Chief Justiciar of England. The position which De Lucy held in close connection with Henry II. no doubt brought him on several occasions into conflict with Thomas à Becket, and after the murder of the Archbishop his contrition seems to have found an outlet in the establishing of the new Abbey, dedicated to St. Mary and St. Thomas of Canterbury, and De Lucy himself resigned his office of Chief Justiciar and entered the Abbey shortly before his death.

The history of the Abbey itself presents very few features of general interest, and, during the 350 years of its existence, its inmates pursued the even course of their way without much outside interference from Church or State.

By the early part of the sixteenth century the position of the lesser abbeys had become more and more precarious. Even before the wholesale destruction of the abbeys by Henry VIII. the smaller abbeys were being one by one suppressed and their revenues appropriated for the foundation of colleges or other institutions.

Lesnes Abbey in 1524 shared this fate with more than a score of other small abbeys. Cardinal Wolsey, looking round for fresh sources of revenue for the establishment of a new college, sought and obtained the papal licence to suppress a number of monasteries with not more than seven inmates. A considerable number of abbeys thus came within his power, and twenty-four in all, Lesnes amongst the number, were suppressed and their revenues diverted to educational purposes.

The annual value of Lesnes Abbey at its Dissolution is given as £186, so that by that date, and with less than seven inmates, it seems that the abbey must have largely outrun its usefulness, and its closure thus came in the ordinary sequence of events.

Mr. Alfred W. Clapham gives the following particulars of the Abbey: "The position of Lesnes Abbey, half-way between Plumstead and Erith, must once have been pleasant enough. It commands an extensive prospect over the marshes, the river and the low-lying Essex shore, and the ground that rises steeply behind is thickly covered with wood, the crest having an irregular and diversified outline, which is still unspoiled by building."

The excavations under Mr. Clapham's supervision have already extended over the site of the church, chapter house and parts of the infirmary, dormitory and frater house.

The church lay for no apparent reason on the south side of the cloister, as at the parent house of Holy Trinity, Aldgate, at St. Mary Overie, at Waltham, at Cartmel, and a number of other Augustinian houses. No part of it was ever used for parochial purposes, and consequently only one fragment now remains above ground.

The plan adopted was the typical Cistercian one of the aisled nave, transepts with eastern chapels and aisleless choir, the dimensions of the nave being 140 feet by 65 feet 6 inches, and comprising eight bays, and the transept 126 feet long by 29 feet wide, three small chapels being formed on the eastern side of the northern arm, and the Lady chapel leading from the south transept. The whole of the details so far excavated are Transitional in character.

W. R. Davidge [*A.*].

FROM INIGO JONES TO SIR CHARLES BARRY.

London County Council Survey of London. Issued by the Joint Publishing Committee representing the L.C.C. and the Committee for the Survey of the Memorials of Greater London, under the General Editorship of Sir Laurence Gomme and Philip Norman. Vol. III. The Parish of St. Giles-in-the-Fields. Part I. Lincoln's Inn Fields. 4*o. Lond.* 1912.

There are certain parts of London familiarly known throughout the world, not only in an historical sense but mainly for the architectural charm they possess; in this regard Lincoln's Inn Fields stands pre-eminent. Even putting aside the aristocratic character of the *mise-en-scène*, it would not be possible to find a similar spot from which to survey the building tendencies of the past three centuries. In the works of Inigo Jones, John Webb, Sir John Soane, and Sir Charles Barry, which constitute the chief architectural interest of the place, is discernible the evolution of a sustained and intellectual movement. Moreover, a spirit of repose pervades the old-world precincts in marked contrast to the cacophony of Kingsway.

The question of the authorship of the houses forming the three sides to the Fields, given in the *Prospect of Lincoln's Inn Fields*, or in the 1683 picture at Wilton House, is undecided. It is known that Inigo Jones, in his capacity as Surveyor General and member of a special commission, laid out the Fields into walks; but it seems more probable that John Webb, who at the time was engaged upon the design of the houses in Great Queen Street, should have been the architect; especially as the houses south of the arched opening to Sardinia Street contained staircases similar in detail. The commanding Newcastle House, which even the loss of the modillion cornice failed to divest of dignity, was begun in 1685 under the direction of Captain Wynne, and appears to have

been in an unfinished state five years later. The Lords Commissioners of the Treasury consulted Sir Christopher Wren in 1693, and he prepared an estimate for various alterations; again, late in the eighteenth century, Thomas Leverton renovated the interior, leaving traces of his refinement in many rooms. Towards the close of the seventeenth century Cavendish Weedon published a design for laying out the Fields; this formal scheme embraced a design by Sir Christopher Wren for a central church, an idea which commended itself to Colin Campbell, who in 1712 produced a design for a large church, 280 feet square, to occupy a similar position.

The next building of importance to be erected, in 1730, was the structure now known as Nos. 56 and 57, on the site of an earlier house. It is curious that little light can be thrown on the name of the architect who designed this handsome building for Charles Talbot, then Solicitor-General; the handling of the detail suggests the Italian mind of Leoni. Ralph criticised the building somewhat drastically, and Sir John Soane carried out alterations to the interior as well as adding the semi-circular portico, but neither Ralph nor Soane have left any note concerning the original architect. The two houses, Nos. 35 and 36, reflect the austere manner of Sir Robert Taylor, whose work has been but little understood or appreciated; attention should be directed to the beauty of the rear elevation with its interesting fenestration and unique glazing. This architect, prior to the invasion of London by the brothers Adam, enjoyed a large practice, and in addition to these two houses probably carried out the houses forming the sides of Southampton Street. Towards the end of the eighteenth century the Royal College of Surgeons removed from their premises in the Old Bailey to No. 41, and in 1803 George Dance the younger and James Lewis were commissioned to design new premises, the building being completed in 1813. In 1834, additional accommodation being urgently required, Sir Charles Barry was called upon to carry out the alterations, and on his advice the site, with the exception of the portico, was cleared. Barry reused some of the columns from Dance's portico, refluting them, and subordinating the portico to the main portion of the new building by introducing his famous treatment of the 'cornicione'; this procedure at the time occasioned a good deal of comment, and the doom of the attic story was predicted; when, however, the disastrous additions of 1888–9 were allowed, this fine composition lost its meaning. The presiding genius of Lincoln's Inn Fields at the beginning of the nineteenth century was Sir John Soane, who from the vantage point of his own residence, No. 13, carried out many alterations to the older buildings hereabouts. Here he formed the remarkable collection of drawings and objects of art, which during his lifetime were accessible to members of the architectural profession, and which at his death were bequeathed by Act of Parliament to the nation. When it is remembered that Sir John Soane's Museum contains some of the most priceless architectural drawings connected with the history of English architecture, including originals by Clerisseau, Piranesi, Zucchi, Sir John Vanbrugh, Sir William Chambers, the brothers Adam, George Dance, Joseph Bonomi and many others, drawings which even the Institute must covet, it appears strange that the number of architectural students frequenting the Museum should not perceptibly increase. Rich in classic architecture, Lincoln's Inn Fields also boasts an impressive Tudor pile, the Library of the Lincoln's Inn Society, designed by Philip Hardwick in 1843, as well as the refined building on the north side erected some years ago by Mr. Philip Webb.

It would be next to impossible to condense within the scope of a review the absorbing and accurate statements contained in vol. iii. of the *Survey of London*, dealing with St. Giles-in-the-Fields, Part I. No pains have been spared by Sir Laurence Gomme, Mr. Braines and his able assistants to describe the minutiæ of this fascinating centre; to be brief, the record of the district is written for all time. The descriptions of the individual houses have been carefully tabulated and reference made to the Hearth Tax Rolls as well as to the rate books to ensure accuracy. It is romantic to peruse famous names brought to light by a study of these authorities, and of deeper interest to obtain lasting information concerning the activities of English artists. One thing is regrettable, some of the illustrations are small, and the measured drawings few in number; this, however, is a defect which will doubtless be rectified in the next volume.

A. E. Richardson [*Licentiate*].

DRAWINGS OF GREEK ARCHITECTURE AT THE INSTITUTE.

By W. R. Lethaby [*F.*].

By the recent gift to the Library by the Society of Dilettanti of the collection of drawings and engravings made for that learned body, the Institute has acquired much unpublished material of great value for the history of Ionian architecture.

Most of the unpublished drawings were made by Bedford and Gandy, who started on their mission exactly a hundred years ago, and doubtless much which they recorded has since been destroyed.

These drawings and engravings were confusedly mixed and a large number had no names. I have sorted them into some order and I find the chief contents of the collection to be as follows:—

A, Original drawings by Revett for Vol. I. of the *Antiquities of Ionia*, with a set of engravings of the same.

B, Original drawings by Bedford and Gandy for the *Unedited Antiquities of Attica*.

C, Original drawings by Bedford and Gandy for *Ionian Antiquities*; Part III. (1840), with engravings of the same.

D, Original drawings by Pullan for *Ionian Antiquities*; Part IV.

E, F, G, Original drawings by Bedford and Gandy, with a large number of proof engravings of Magnesia, Myra, Telmissos, &c.

These last (E, F, G), comprising perhaps a hundred drawings, and proof engravings without the original drawings, appear to be entirely unpublished.

In the Introduction to the enlarged reissue of the first volume of the *Ionian Antiquities* (in 1821), we are told that Messrs. Bedford and Gandy had been sent to Greece and Asia Minor in 1812, to gather material for "the present work and another now in progress." The large number of fine proof engravings must, I think, have formed part of the proposed new work. One of them is signed by the engraver Freebairn, 1832; another by the same is dated 1834; one other is noted as unfinished in 1834, and a plan of Myra is lettered "Published by the Society of Dilettanti 1837." This part of the work never, I believe, appeared, but in 1840 Part III. of the work was issued (C, above) with engravings of Cnydus, Aphrodisias, and Patara.

We thus have in the collection a large number of original drawings made soon after 1812, and *unique* proof engravings from lost originals made at the same time.

Of this original material the most interesting is a full and accurate survey of the ruins of the beautiful Ionic temple at Magnesia (E). The temple was pseudodipteral, with eight columns at the ends and fifteen on the flanks. Its raised platform was about 100 feet by nearly 200 feet. The positions of the side cella-walls were found. The columns of the fronts were disposed so as to give wide central intercolumniations of about 17 feet, those next being 13 feet 9½ inches and the outer ones a little less. The angle columns were nearly 4 feet 7½ inches in diameter, the others about an inch less. At the S.W. angle the architrave of the front was still lying, its length being 16 feet. The columns were about 38 feet high, of an interesting type of Ionic. The bases were very beautiful, having laurel leaves carved on their toruses. The capitals were also very elegant, the rolls of the volutes being delicately carved with *various* forms of leafage. The details of the capitals and bases are exquisitely drawn, and give, I think, some particulars absent in the recent German account of this temple by Carl Humann. Altogether this English survey, a century old, is of high interest.

The temple at Magnesia was built in 220–200 by Hermogenes, the architect, whom Vitruvius largely used as an authority. It followed the type of Ephesus, and some points are valuable for comparison with that temple. Thus the soffit of the architrave was as wide as the extreme projection of the abacus, while at Ephesus the beam seems to have been even wider than the abacus. The ceiling of the peristyle was of wood; this was the case at Messa too, and I have no doubt at Ephesus also. The steps of the platform were notched down into one another as at Ephesus, and the pediments were without sculptures, as apparently were those of Ephesus and Priene. On the other hand, a sculptured frieze is used here (for the first time in Ionia?). No frieze has been found at Sardis, a work in many respects similar to the Magnesian temple. The bases are of the Attic type which had been used at the Erechtheum.

F is a collection of the monuments of Myra, including a large number of drawings of the strange rock-hewn tombs. One of these, of which there is a coloured drawing, had beautiful sculptured reliefs of the fourth century. These were coloured a bright yellow on an azure ground. Texier gives enlarged details of some of the sculptures.

Other drawings and engravings are of the fine tomb, also engraved by Texier, which had a pediment containing a relief of a lion and a bull fighting. These versions vary a good deal from the published plates, and as Texier is not famous for accuracy they are probably more trustworthy. Another of these tombs is a beautiful example of the type which imitated timbering. It had a pediment with a relief of two warriors. This tomb is identified by its appearing in the general view of Myra in the collection. Probably this drawing is the only existing record of this fine monument. An engraving of another tomb of the "timbered style" shows a pediment with reliefs of a banquet scene. This tomb also seems to be indicated in the general view. One of the many other drawings represents a tomb with a Lycean inscription with letters coloured alternately red and green. Several of the drawings show the sliding stone doors of these tombs. On the back of the water colour of the general view is a sketch of a carved frieze from the theatre of Myra.

G, Telmissos, &c. Here again we have some earlier and more accurate records of the monuments engraved by Texier. One of these is a tomb with two Ionic columns having plain volutes to the capitals which were completed by painting (*cf.* Texier, vol. ii., pl. 175). An engraving represents a tomb at Antephellus very much like the Lycian ark-shaped tombs in the British Museum. Like those, it has pairs of semi-lions projecting from the roof. It is identified by Texier's plate 195, vol. ii. This view shows the other end with different sculptures.

The prints are of the best style of the best period of English engraving, and the drawings are highly finished; all are ready for publication, and to publish them by modern methods of reproduction would not be expensive. Would not the Society of Dilettanti consider the feasibility of adding one more volume to their splendid labours in the past?

9 Conduit Street, London, W., 28*th September* 1912.

COMPETITIONS.

Rangoon Municipal Buildings Competition.

Messrs. Ogilvy Gillanders & Co., of 67 Cornhill, E.C., agents for the Rangoon Municipality, write under date of the 3rd September that they have been advised by cable from the Rangoon Municipality that the time stated in clause 14 has been further extended to 1*st March* 1913. The latest date for posting letters to reach Rangoon by that date will be by the Indian Mail closing in London on Friday, 7th February 1913.

CHRONICLE.

R.I.B.A. Sessional Meetings, 1912-13.

Nov. 4. President's Opening Address.
Nov. 18. Bath and Wells. Paper by Mr. J. L. Ball.
Dec. 2. Business Meeting.
Dec. 16. The Walls of Visby, Gotland. Paper by Mr. Horace Porter, M.A. Cantab. [*A.*].
Jan. 6, 1913. Business Meeting.
Jan. 20. Canadian Architecture. Paper by Mr. F. S. Baker [*F.*] (Toronto).
Feb. 3. President's Address to Students. Presentation of Prizes.
Feb. 17. Modern Hospitals. Papers by Messrs. A. Saxon Snell [*F.*] and Wm. Milburn [*A.*].
Mar. 3. Business Meeting: Election of Royal Gold Medallist.
Mar. 17. Modern French Architecture. Paper by Mr. F. Billerey.
Apr. 7. American Museum Buildings. Paper by Mr. Cecil Brewer [*F.*].
Apr. 21. Modern Steel Construction. Papers by Messrs. F. N. Jackson [*H.A.*] and Bernard Dicksee [*F.*].
May 5. Annual General Meeting.
May 26. Modern Architecture. Paper by Mr. Thomas Hastings (New York).
June 9. Business Meeting.
June 23. Presentation of Royal Gold Medal.

Licentiates and the Fellowship.

The following Licentiates have passed the Examination qualifying for candidature as Fellow:—

CRICKMER: Courtenay Melville, 1 Lincoln's Inn Fields, W.C.
ELCOCK: Charles Ernest, Colwyn Bay.
HAYWOOD: William, 245 Bristol Road, Birmingham.
LITTLE: Owen Cary, 5 Bedford Row, W.C.
MARTIN: Arthur Campbell, 11 Hart Street, Bloomsbury, W.C.
MILNE: Oswald P., 16 Great James Street, W.C.
STREATFEILD: Granville Edward Stewart, 9 Stone Buildings, Lincoln's Inn, W.C.
TATCHELL: Sydney Joseph, 13 Queen Anne's Gate, Westminster, S.W.
WATSON: John, 225 St. Vincent Street, Glasgow.
WILLEY: Frederick, Shincliffe, Durham.

Scholarships in Art.

The Board of Education propose, if there are candidates of sufficient merit, to make the following awards in Art in 1913:—Ten Royal Exhibitions (£60 a year for three years and instruction in the Royal College of Art); six National Scholarships (£60 a year for three years and free admission to the Royal College of Art); not less than fifteen Free Scholarships, entitling each holder to tuition in the Schools of the Royal College of Art; and twenty-four Local Scholarships tenable at Schools of Art recognised by the Board, with allowances of £20 a year each for three years. These awards will be made upon the results of the Board's examinations in Drawing, Painting, Modelling, Pictorial Design, and Industrial Design, or, in the case of candidates in Architecture, upon those of the Intermediate Examination of the Royal Institute of British Architects, to be held in June 1913. The Regulations may be obtained from his Majesty's Stationery Office, price 1*d.*

School of Art Wood-Carving.

The School of Art Wood-Carving, 39 Thurloe Place, South Kensington, has been re-opened after the usual Summer vacation, and it is intimated that some of the free studentships in the Evening Classes are vacant. The School, which is under Royal Patronage, was established in 1878 for the encouragement of the art of wood-carving in this country as a branch of the Fine Arts. It is aided by the London County Council and by the Board of Education. The subjects taught are Wood-Carving, and in relation thereto Design, Modelling, History of Art, Geometrical and Outline Drawing. Forms of application and any further particulars may be obtained from the manager.

Garden Cities and Town Planning Association.

Mr. Ewart G. Culpin, Secretary of the Association, writes:—"The Garden Cities and Town Planning Association is prepared to send lecturers to any part of the country to deal with the great and increasingly important question of Garden Cities and Town Planning. The housing of the workers demands more and more attention as time goes on, and the inquiries which we receive from all parts of the world show how genuine is the desire that something shall be accomplished. In order to focus these aspirations, lecturers competent to deal with all aspects of the case have been

secured, and dates may be booked up. Lectures may be either singly or in series, and I shall be glad to hear from anybody interested with a view to making arrangements." Mr. Culpin should be addressed at the Offices of the Association, 3 Gray's Inn Place, W.C.

The Regent Street Quadrant.

A Committee, consisting of the Earl of Plymouth, C.B., Sir Henry Tanner, C.B., I.S.O. [*F.*], Mr. Reginald Blomfield, A.R.A., President R.I.B.A., and Mr. John Murray [*F.*], has been appointed by the Treasury to consider the design to be adopted for completing the rebuilding of the Quadrant, Regent Street.

OBITUARY.

George Tunstal Redmayne [*R.F.*].

On Saturday, 24th August, there took place at Haslemere Parish Church the funeral of George Tunstal Redmayne, whose death occurred on the morning of Wednesday the 21st, after some months of illness.

In a certain sense it might be said of him that he was one of the few true survivors of the Gothic revival. In so calling him it is not intended to imply that there are no present-day students and performers of good Gothic work, still less that George Redmayne was in his art a mere adherent of that Victorian school whose mannerisms were often faults. Rather might it be said of him that he was among the few who, trained under the rules of the Gothic revival, lived on into the present century without changing the source of his vitality. His work, it is true, was full of original vigour, but it was all based upon the mediæval foundation; and I am not aware that he ever made any approach to Classic, or even to definitely Renaissance studies.

Redmayne was born at Highgate on the 27th December 1840. His father, Giles Redmayne, came, I believe, of a Yorkshire family, and settled in London on purchasing a well-known silk business which still bears the name. His mother's maiden name was Margaretta Roby. George Redmayne was the youngest of the family, and it was after his birth that his father purchased and resided at Brathay Hall, Ambleside.

After education at Tonbridge School, Redmayne was articled to the late Alfred Waterhouse, R.A., whose practice was at that time in Manchester. The connection became more than a professional one, for in 1870 he married Waterhouse's sister Katherine, who died several years ago. Redmayne always practised in Manchester (residing chiefly at Alderley Edge), except that after transferring his residence to Haslemere in 1894 he continued to conduct a voluntarily restricted practice from his new home. He was never greedy for multiplicity or magnitude of work. His personal thought and personal labour entered every detail of his designs, and he was exceptionally careful in making sure that nothing should appear in his work which was meaningless or nugatory. His comparatively small list of executed works is, therefore, not by any means to be attributed solely to lack of opportunity.

Among the buildings in which he best satisfied his own intentions were: The Scottish Widows Office, Albert Square, some business premises at No. 20 Cross Street (recently altered), the School of Art, and the Racquet Courts, all in Manchester. His two best country houses were Whitton in Herefordshire for Mr. Richard Green, and Feldemore in Surrey which he built *à deux reprises* for his brother-in-law, Mr. Edwin Waterhouse. His best church, St. Chrysostom's, Victoria Park, Manchester, was unfortunately destroyed by fire. Other of his buildings were a house at Mayfield in Staffordshire for Mr. Joseph Simpson; the Dalton Hall, Manchester, for the Society of Friends; Schools at Knutsford and Broadbottom, and various small works at Ambleside and Alderley. Many of these buildings show that he was capable of carrying out work on an important scale; the Scottish Widows Building in particular is as good a proof as one could have that there was real art and real sense in that mediæval revival which is to-day so readily despised. It is virile and fresh.

But Redmayne's heart went out into the little things. In designing a tombstone—and there are many of his in the Brathay Churchyard—he composed a memorial ode. He would compress into these few feet of stone the personal tribute that a poet would weave into the fourteen lines of a sonnet.

At Haslemere he erected at his own cost (1901) a churchyard cross in commemoration of the nameless dead, and there are many who could tell of the generous gift of his talents when for a church or for a friend he offered with brain and pencil the tribute of some tender and thoughtful design.

Redmayne was one of those who submitted themselves successfully to the Voluntary Examination of the Institute which preceded the establishment of the obligatory test. He became an Associate in 1872 and a Fellow in 1877, and was placed on the list of Retired Fellows in 1902.

I suppose that not many of our living London members knew him personally, but all who did will understand why I cannot end without a word on that gift of humour which was so evident a feature of his personality. With pen, with tongue he was unfailingly ready. His letters were often masterpieces of dry mirth overflowing with untainted merriment, and even his Presidential Address delivered in 1886 to the Manchester Society of Architects shows beneath its official soberness the gaiety of infectious wit.

Among the stories which cling in the memory of his Manchester friends one is specially and delightfully characteristic. He had been asked by his Vicar for a donation to a special object. For once, to the priest's surprise, the answer from this generous giver and good Churchman was "No," and Redmayne added the unexpected words "You must not expect me to assist you in an attempt to deceive the Almighty." The special object (can you guess it ?) was a set of tubular "bells."

Redmayne is survived by his two sons, Mr. Martin Redmayne and Mr. Leonard Redmayne. A good crayon portrait of him by the late G. F. Watts, R.A., is the outcome of a friendship between neighbours and the evidence of an artistic sympathy. PAUL WATERHOUSE [*F.*].

Henry Hall.

Henry Hall [*Associate* 1872, *Fellow* 1887], whose death, after a long illness consequent on an operation, occurred on the 2nd inst., was born in 1849. My acquaintance with him began at Tonbridge School. All through life he was very short-sighted, and as a boy this prevented him from taking part in most games: in consequence the time during which he otherwise would have been playing cricket and football was mostly spent in the carpenter's shop. He became quite a skilful joiner, and the training was of great value to him in the work of his life.

Hall was articled to the late Edward I'Anson, and while serving his articles he attended the evening classes of the Royal Academy. Here he came under the influence of Mr. Phené Spiers, to whose training he always felt and expressed a high sense of gratitude.

In 1883 Hall and I competed for the Miller Memorial Hospital, Greenwich, and were successful, and from this time we worked more or less together until, about the year 1896, we entered into partnership, which lasted until at the end of last year his health compelled his retirement and our long connection was severed.

During the years of our partnership we carried through many works, mostly in connection with hospitals, though we had a fair amount of other work. As an architect Hall's forte lay in planning, but more especially in devising intricate alterations, at which he was very facile.

KEITH D. YOUNG [*F.*].

John Thomas Bressey [*Fellow*, elected 1877] passed away on the 28th August in his sixty-ninth year. Mr. Bressey served his articles with the late Henry Jarvis, of Trinity Square, Borough, was for a short time in the office of Professor Kerr, and commenced independent practice about the year 1867. His buildings included National Schools at Chingford, many private houses in the neighbourhood of Wanstead and Walthamstow, model cottages, shops and warehouses in Whitechapel, a large farmhouse in Devonshire, a Wesleyan chapel at Wanstead, large brewery premises at Stratford, &c., Holy Trinity Church, Leytonstone, and the Council Offices at Wanstead. He was a member, and for two years master, of the Coopers' Company, and for forty-five years was consecutively surveyor and consulting surveyor to the Wanstead Local Board and its successor the Urban District Council.

George Friend, of 44 Earl Street, Maidstone, who died on the 21st August in his ninety-second year, had been a Fellow of the Institute since 1888. Mr. Friend served a pupilage of six years with Mr. Clarke, of Framlingham and Ipswich, and afterwards was assistant to the late R. W. Phipson, and later clerk of works to Mr. Frederic Chancellor, of Chelmsford and London. He commenced practice in Maidstone in 1853. He was the architect of the Rochester and County Club, and of several country houses, brewery buildings, farmsteads, cottages, warehouses, &c., in Kent and adjoining counties. He was at one time Surveyor to the Dean and Chapter of Rochester, and Surveyor to the Hastings Cottage Improvement Society. As a younger man he took a prominent part in municipal work, representing the High Street ward on the town council. His practice is being continued by Mr. Wm. H. Poole, *Licentiate*, who has been for several years in his office as assistant.

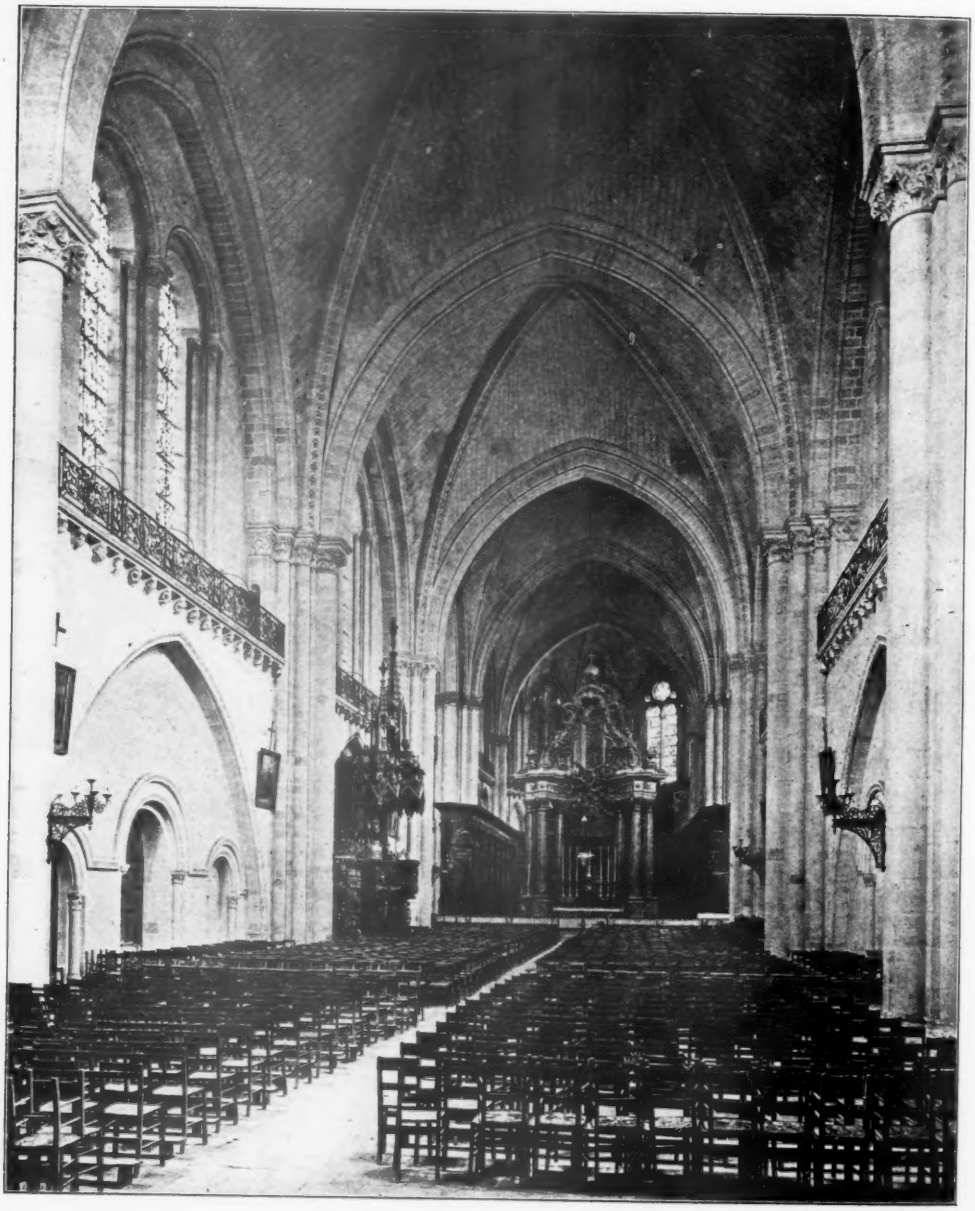
"Architects from George IV. to George V."

[JOURNAL 27th July.]

From Mr. MAURICE B. ADAMS [*F.*]—

On the information of Mr. William Grellier [*F.*], of Queen Anne's Gate, S.W., it may be mentioned in regard to the competition for the Royal Exchange (referred to on page 602) that the first premium (£300) was awarded to his father, WM. GRELLIER [1807–1852], architect of the Royal Exchange Insurance Buildings, Liverpool, and Hon. Secretary of the London Architectural Society at the time of its union with the R.I.B.A. in 1842 (p. 606). Wm. Grellier was awarded the Royal Academy Silver Medal for Architecture in 1826, and the Gold Medal in 1829. He was a frequent exhibitor at the Royal Academy, and contributed largely to the Architectural Society's Portfolio of Measured Drawings which afterwards came into the possession of the Institute. He held the office of District Surveyor for Whitechapel. Among his buildings besides that at Liverpool above mentioned are the Almshouses at Ball's Pond for the Tilers' and Bricklayers' Company, the Ethelburga Schools, and the Dry Metre Gas Works on the New North Road.

In the list at the end of my Paper I find that I have omitted the name of GEORGE PAPWORTH [1781–1855], brother of John Papworth. He visited Dublin in 1806 and was patronised by Lords Westmeath and Gormanstown, and in 1809 built Sir Patrick Dun's Hospital in a similar style to Gandon's work. Between 1818 and 1820 he altered and added to the building of the Dublin Literary Society, erecting the façade in D'Olier Street. In 1823 he designed the King's Bridge over the Liffey, near Phœnix Park, and in 1831 was elected a member of the Royal Hibernian Academy.



ANGERS CATHEDRAL: NAVE, LOOKING EAST [Photo. E. Lefèvre-Pontalis.